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TRANSPORTATION IN WARTIME
AND THE
UNITED NATIONS

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JOHN A. KROUT

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FOR THE
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VOLUME I
THE POLITICAL SCIENCE
OF THE UNITED STATES
AND CANADA
BY
JOHN B. COOPER

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PREFACE

“**T**HIS is one war!” Thus did the President of the Academy of Political Science forcefully set forth the main theme of the Sixty-Second Annual Meeting held at the Hotel Astor in New York City on Tuesday, November 10, 1942.

The essential unity underlying numerous battles now raging, on almost every continent and every sea, throws into sharp definition gigantic problems of time and space implicit in this global war. Victory may yet reward the side which first adequately bridges the distances, still so formidable in terms of miles and hours, that separate Guadalcanal and Chungking and Bizerte and Murmansk and all our other military fronts.

The formal addresses and extemporaneous discussions, printed in these PROCEEDINGS under the caption of “Transportation in Wartime and the United Nations”, present opinions of distinguished military and civilian leaders, many of whom are today engaged in translating ingenious plans into substantial achievements. These experts are little interested in disputes involving relative merits of various agencies of transportation and communication, but they are much concerned over the necessity of combining land, sea and air transport as complementary units of an efficiently integrated service of supply. Their proposals become even more significant, as expeditionary forces of the United Nations assume the offensive in North Africa and in the South Pacific.

Realizing the difficulty of arranging the Annual Meeting in these troubrous times, the officers of the Academy extend their thanks particularly to the guest speakers and to the efficient Committee on Program and Arrangements, which included: Frederick P. Keppel (Chairman), Miss Ethel Warner (Director), W. Randolph Burgess, Nicholas Murray Butler, R. D. Calkins, John C. Cooper, Frederic R. Coudert, Lewis W. Douglas, Marshall Field, Leon Fraser, Edwin F. Gay, Harry D. Gideonse, Luther Gulick, Pierre Jay, Thomas W. Lamont, Roswell Magill, Charles Merz, Shepard Morgan, Robert Moses, William L. Ransom, Franz Schneider, Alfred P. Sloan, Jr., Arthur Hays Sulzberger, Eliot Wadsworth, Leo Wolman, Owen D. Young.

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PART I

THE WAR OF DISTANCES

INTRODUCTION *

LEON FRASER, *Presiding*

President of The First National Bank of the City of New York
Trustee of The Academy of Political Science

THE meeting is called to order. It is the custom of this Academy to discuss topics which are timely. Today no topic could have been more timely than that of "Transportation in Wartime".

Over the week-end you witnessed a magnificent episode in transportation; and every phase of that operation, and what has led up to its successful outcome, is covered by the topic of today. That African operation—the movement of the men, the movement of the trucks and the movement of the tanks—began over the American railroads; and when history is written, the record of the American railroads in transportation will be a very proud story indeed.

In presenting to you the first speaker, a graduate of Amherst, honored later by his Alma Mater with the degree of Doctor of Laws and similarly so honored by many other institutions of higher learning, a man who is a master of the subject of transportation, I have the honor to introduce Mr. Joseph B. Eastman, who will present the first paper on this timely topic.

* Opening remarks at the First Session of the Annual Meeting.

PERFORMANCE OF THE AMERICAN RAILROADS

JOSEPH B. EASTMAN
Director, Office of Defense Transportation

AS I am today addressing the Academy of Political Science, I presume that a more coldly analytical discussion of war transportation is appropriate than I would normally undertake under present conditions. The subject permits of such treatment, and is of very considerable interest from the standpoint of political science.

Never in any war has transportation been of more all-pervasive importance than it is today. Someone has called this a "war of movement", and it certainly is from every point of view. The dimensions are global, but my immediate concern is with our domestic transportation system. That system has the duty in the war effort of bringing the raw materials to the war production plants, of moving the semi-finished or finished products to points of further fabrication or of use or of embarkation, of moving our millions of troops, of supplying our camps, and of moving the millions of war workers to and from their work. At the same time it must play its very vital part in keeping civilian economy and morale at the level which is essential to an all-out war effort.

I need not describe in detail the extraordinary burden which the war has laid upon our transportation system. The productive activity of the country has risen to heights never before approached; and as transportation is the life blood of production, of course the work which the transportation system has to perform has increased correspondingly. The fact to which I particularly direct your attention is that our domestic transportation system is having to carry this extraordinary load with fewer facilities than it had at its command when the emergency began.

The loss so far has been chiefly in transportation by water. Because of the necessities of war, there is no longer any commercial transportation by water between our coasts through the Panama Canal, and a great part of our heavy coastwise shipping has also ceased. With the exception of iron ore and oil,

we have even lost in our capacity to transport by water on the Great Lakes.

A further loss is in the capacity to transport by highway automotive vehicle. We had become a nation on tires. Rubber-borne vehicles had taken an extraordinary place in our economy, to an extent unknown elsewhere in the world. Suddenly we lost practically all of our sources of natural rubber, and we are now in the process of creating, at immense cost and effort, new sources of synthetic rubber. In the meantime we have stopped completely the building of new automobiles and trucks and almost completely the building of new buses. We have also been forced to put our existing stock of rubber-borne vehicles under severe restrictions, so that their capacity to serve has been much reduced, and the full force of these restrictions has not yet been felt. Bear in mind that, leaving trucks and buses entirely out of consideration, the private automobile had become by far the greatest factor in the transportation of people in this country, and I include in that statement intercity as well as local transportation. Bear in mind, also, that the restriction in speed to a maximum of 35 miles an hour in itself produces a material loss in capacity to serve.

Naturally the brunt of this loss in capacity has fallen upon the railroads. If they could have expanded their facilities freely to meet the new demand, our transportation problems would have been less acute, but the fact has been that the railroads have not been permitted to expand, and the same has been true of the inland water carriers. New equipment for both draws upon the stock of critical war materials, particularly steel, and the military demands upon that stock for a global warfare are tremendous. In the circumstances, expansion of rail and inland waterway facilities has been held within very narrow limits.

It was our good fortune that in the pre-war days we had what appeared to be a large surplus of transportation facilities; but it was not a surplus in terms of the present colossal productivity of the country, to say nothing of the fact that we now have fewer facilities than we had then. Yet there has been no breakdown of our domestic transportation system. Thus far it has functioned admirably. Let us see how this has been done. I shall discuss, first, the railroads and their freight traffic.

The railroads have had, in brief, the task of moving, without substantial expansion of facilities, a huge and increasing volume of freight traffic under conditions made more difficult, not only by the necessity of taking on much traffic which had formerly been moved by other carriers, but also by a heavily swollen tide of passenger traffic plus incessant troop movements. In attacking this problem, they have had the help of their employees, the shipping public, the Interstate Commerce Commission, and the Office of Defense Transportation. Two broad lines of attack were possible. One was to get the utmost possible work out of the facilities available. The other was to reduce the amount of work to be done. Both have been followed.

The railroads learned much from their experience in World War I. Then they were taken over and operated as a unit by the federal government. The advantages of centralized control over freight car movement were demonstrated. Upon the return to private operation, what is now the Car Service Division of the Association of American Railroads was formed to preserve those advantages in large part. To that Division the individual railroads have delegated considerable power to control car distribution and movement in the event of need. The Division was also instrumental at an early date in organizing Regional Shippers Advisory Boards to get the help of the shippers in forecasting traffic demands and in the efficient movement of freight. In 1920, also, the Interstate Commerce Commission was given broad powers over freight service in general and drastic powers in emergencies. It established a Bureau of Service to administer these powers.

These aids to centralized supervision of railroad freight service were supplemented, after we entered the war, through the creation, by executive order, of the Office of Defense Transportation. The government did not, as in World War I, take over the railroads or any other carriers. Instead the President created an agency to lend them help and guidance, with war powers enabling it to promote maximum utilization of the facilities available and to prevent waste effort. The ruling principle is coöperation. Under this plan, the advantages were retained of the initiative and enterprise in private management,

but the individual carriers were enabled to operate more nearly as a single system than would otherwise have been possible.

The fact is that the rigors of competition between railroads, and between them and other forms of transportation, have abated considerably and, in my opinion, they will continue to abate progressively for the duration. Under the Car Service Division, freight cars are now pooled for most practical purposes, and much the same is true of passenger coaches and even of locomotives. The troop movements have carried coaches far off the lines of their owners and all over the country. Railroads have joined with each other in supplying the equipment needed for such movements and at times for other movements. Roads with a surplus of motive power have loaned locomotives to roads with a deficit. In the movement of oil from the Southwest to the eastern seaboard, my Office has taken over the routing of trains and at its request the competitive solicitation of this traffic has been discontinued. We have also been instrumental in arranging a substitution of tank trucks on short hauls for thousands of tank cars, so that the latter could be used for the long-haul movements. These are merely illustrations.

Another lesson well learned in the last war was that freight cars are made for movement and not for storage, and that the higher the velocity of movement the more work they can do. In the succeeding years, great improvement was made in this respect through better motive power, better signaling, better yard operation, and better classification and scheduling of trains; and progress was helped by the fact that the trucks were taking so much of the short-haul traffic. Many railroads adopted the truck as an auxiliary for terminal and small station operations. At the outset in the present emergency the railroads made it a cardinal principle that freight would not be loaded without reasonable assurance that the car could be unloaded when it reached its destination, and they applied this principle in close coöperation with the shippers of the country, including particularly the Army and the Navy. The shippers, through the Advisory Boards and other organizations, have also given most valuable help in unloading and loading the cars quickly, and this has been effectively supplemented by the supervision of the Interstate Commerce Commission.

Velocity of movement is, of course, greatly retarded if congestion develops at ports, gateways, or other critical places. The movement of freight to the ports has been coördinated with its movement thence overseas, by a Traffic Control Committee, made up of representatives of the Office of Defense Transportation, the Army, the Navy, the War Shipping Administration, and the British Ministry of Transport, which is in daily session. The object is to prevent the accumulation at the ports of cars awaiting the arrival of ships. The coördination is helped by storage facilities which have been established by the Army and Navy at inland points within easy reach of the ports and by continual supervision of the storage situation at the ports by my Division of Storage. To avoid congestion on lines and at critical inland places, my Office has a system in operation which enables it to know, within thirty-six hours, traffic conditions on every important railroad route and channel of movement and at every important terminal. With the warnings of impending trouble which this system gives, steps can often be taken to avert it. My Office also has experienced operating men at the ports and other strategic points, who work with the supervisory forces of the Car Service Division and the Commission.

Cars can be made to do more work, also, if loaded as heavily as practicable. Less-than-carload freight, which the railroads load in the cars, was being loaded very lightly. By an order of my Office, which authorized, among other things, pooling arrangements and coöperation with trucks and forwarders, the average load per car has been increased from less than five tons to more than ten tons, saving the equivalent of about 80,000 cars. On November 1, another order became effective which, in substance and with necessary exceptions, requires shippers to load cars to capacity to the extent practicable without damage to the lading. These orders not only save cars, but they also relieve motive power to a considerable extent.

The railroads have done a splendid job of maintaining their equipment. The percentages of bad-order locomotives and cars have been reduced to record low figures, although the equipment is being driven harder than ever before; and, as I have said, it is being shared as need arises. Steps are under way, also, to arrange schedules and movements so that the tractive power of the locomotives will be used to the greatest advantage

and interference in train movements will be reduced to a minimum.

In 1941, ton-miles of revenue freight carried rose above all previous marks, and this was done with about 30 per cent fewer cars and less tractive power than the railroads had in 1929. This year ton-miles have been averaging nearly 30 per cent in excess of last year. In 1919, the railroads in the Eastern District owned 599,140 freight cars. In June 1929, the total was 552,486, but in June 1942 it was only 343,553, or 255,587 fewer than in 1919 and 208,933 fewer than in 1929. In the first seven months of 1942, however, these Eastern railroads moved 24.9 per cent more ton-miles than in the corresponding period of 1929, with 37.8 per cent fewer cars owned and 35.6 per cent fewer cars on line. The gross ton-miles per freight train hour increased 42.2 per cent.

The amount of work to be done by the railroads in moving freight can be decreased by diversion to other forms of transportation, by avoiding undue circuitry of routing, by changing the distribution of commodities so as to reduce cross hauling and excessive hauling, and by eliminating the nonessential transportation of commodities. The ability of the railroads to perform the work can be helped by spreading the traffic load throughout the year so as to cut down the peak which normally comes in October.

My office has been promoting vigorously diversion of freight to inland and intracoastal waterways, with results that have been satisfactory, except in the case of the southbound movement on the Mississippi River system. That situation is now improving. The capacity of trucks is decreasing, for the reasons that I have stated, but there are opportunities for shifting freight as between railroads and trucks, dependent upon which is the more efficient form of transportation for the service involved. There have been many such shifts in the case of tank cars and tank trucks and in the case of package freight. Other opportunities are under intensive investigation. Under present traffic conditions and with the abatement of competitive solicitation, we believe that undue circuitry of routing is now a waste of minor consequence.

To curb the waste in distribution caused by cross hauling and excessive hauling, my Office is now working in close collabora-

tion with the War Production Board and its transportation and industry divisions. Some results have already been secured, but more are in prospect. Much transportation of nonessential commodities has been eliminated by the stoppage of their production, and that, in my judgment, is the proper way to bring about such elimination. We doubt whether there is now much such transportation. No system of priorities and preferences in the handling of railroad freight has yet been established, and I earnestly hope that none will be necessary, because of its demoralizing effect on railroad operation in general. Vigorous campaigns have been waged to induce the movement in the off-peak months of coal and other commodities which can be stored, and these campaigns have been successful in cutting down the October peak materially. The curve of yearly traffic is leveling off, with much advantage to the railroads.

Turning to intercity passenger traffic, the bus is now a most important collaborator with the railroad in this field. The buses have largely taken the place of the old local train. They are accounting for three-fifths as many passenger-miles as the railroads and serve thousands of communities which have no railroad service, or practically none. Until recently, also, the private automobile was a more important factor in intercity travel than the railroad and the bus combined. The growth in passenger traffic has been fully as great as the growth in freight traffic, and of late it has been even more rapid. The railroads are taking care of a tremendous and increasing volume of troop movements for which they must be ready at a moment's notice; both the buses and the railroads are carrying great numbers of soldiers and sailors on furlough or leave and also of visitors to their camps; there is a tremendous amount of travel on government business; gasoline rationing is rapidly eliminating the private automobile as a factor in intercity travel; and the good earnings of the people generally are stimulating the urge to travel. In addition the railroads are being called upon in many instances to install commutation service to and from the great new war production plants.

Here is a situation where the opportunities to get more work out of the equipment are not large and where no expansion of the equipment has been permitted. Many lightly used trains on branch lines and the like have been discontinued, train schedules are being adjusted to get maximum results from the

motive power, and much the same has been done on the bus routes, including the pooled operation of many competitive lines. The record thus far has been good. The troop movements have been handled to the entire satisfaction of the military authorities, and the civilian travel has been accommodated, although at times with considerable overcrowding and discomfort. Comparing the first six months of 1942 with the same period in the boom year 1929, the railroads in the Eastern District handled 14 per cent more passenger-miles with 24 per cent fewer cars. The average load per car increased 40 per cent, cars per train increased 7.5 per cent, and cars per locomotive 16 per cent. As an indication of the bus performance, passengers carried in the first six months of this year increased nearly 62 per cent over the number carried in the same period in 1942, and this was done with a negligible increase in the number of buses and an increase of less than 20 per cent in mileage.

Looking ahead, it seems quite evident that with gasoline rationing and continued growth of our armed force, the passenger traffic difficulties of the railroad and buses will increase, and that the accommodations will often be insufficient to meet the demand. The remedy is obviously to curb the unnecessary pleasure travel, which now accounts for a large portion of the total, and particularly the week-end and holiday travel which produces the peaks. Positive suppression of such pleasure travel by some system of priorities or rationing presents enormous difficulties, especially in view of the man power shortage. Hundreds of millions of passengers between hundreds of thousands of places are involved. We have put a positive curb on special trains and buses and extra sections, which more often than not are the product of unnecessary travel. Discomforts have tended to limit travel, and there has been considerable response to the requests that our extraordinary convention habit be kept within narrow bounds, and that vacations be staggered and begin and end in the middle of the week.

Plainly, however, efforts must be redoubled to bring home to the people the fact that the business of war has first call on our passenger-carrying facilities, that it has given the railroads and the buses a herculean task, that there is small margin for mere pleasure travel, and that the duty of good citizens, if they do not wish to impede the business of war, is to travel as little as possible. This is not a pleasing prospect, but neither is war.

The patriotism of the public in this respect will be put to a severe test in what has been the holiday season at the end of the year.

The truck situation reflects a serious emergency caused by the rubber shortage. Our economy is now dependent on trucks to an extent which few realize. We are apt to think of trucks in terms of the huge vehicles which carry freight for hire over the highways, but they are only a small part of the total. The great majority of the trucks are privately owned and used in farm and community service. Most of what they do is essential, but the rubber shortage imposes positive limitations which cannot be disregarded. The trucks and their tires must be given extreme care, and their mileage must be drastically cut. Much has been done along these lines, but much remains to be done. Fortunately the opportunities are good, for there has been great waste in truck operations. Owing to the vast number of individual ownerships and operations, it is peculiarly a situation which calls for much collective action and coöperation if the wastes are to be avoided.

The positive curbs on operations lie in the rationing of gasoline and tires. The administration of this rationing requires an exploration and examination of individual operations which is, beyond question, the most difficult and distasteful task which my Office has undertaken. It is equally difficult and distasteful for the operators. However, we have put our hands to the plough and we shall not turn back. We hope to get the bugs out of the system, as we go on, and to temper our activities with some degree of horse sense. We are also inviting the close coöperation of those who may regard themselves as our victims.

I wish I could spend time with you on the local transit problem, which includes the transportation of the millions of workers to and from war work, but this address is already too long. I should like, also, to tell you of the extraordinary performance of the iron ore boats on the Great Lakes, of what is being done by the pipe lines and air carriers, and of what my Office is doing in connection with storage and with the man power situation, so far as transportation is concerned. My entire story seems to be one which calls for presentation in serial form.

There are, however, some general conclusions to offer for your consideration. The basic problem in our war transportation has been to do a vastly increased volume of work with a

practically static and in some respects a shrinking volume of facilities. Through various expedients the work has thus far, on the whole, been successfully done. However, there is a limit to the amount of slack which can be taken up and there are obvious dangers, in wartime, in taking too great chances with transportation. The time has come, I believe, when more consideration must be given to the needs of the carriers for new equipment.

From the standpoint of political science, it is of particular interest to note that many of the wastes in transportation which we are now undertaking to eliminate are wastes which are a by-product of competition. That competition is inherently wasteful in various respects I think we all know. The redeeming thing is that it sharpens the wits and is an incentive to enterprise and initiative. It would seem that in the post-war period one of the objectives should be to strike a proper balance between these opposing phases, so far as transportation is concerned. In other words, the process of integration should be carried as far as it can be carried without losing the benefit of the competitive urge.

The present coöperative arrangement between the government and the carriers should also be of much interest to the political scientist. An alternative, of course, is government ownership and operation. There are some, although they are not particularly vocal at present, who no doubt favor this alternative, at least in the case of the railroads. What post-war conditions may make necessary I do not know. Under present conditions and for the duration, there would be some theoretical advantages in operating the railroads as a unit, a single system. Effective and efficient organization for the administration of such a huge system is, however, no simple undertaking. One of the troubles with the United States Railroad Administration at the time of the last war was that it was obliged to improvise such an organization almost overnight. The organization which it created was never satisfactory, either to the shippers or to the railroad operators, and there was the further impediment to good morale that the taking by the government was not on a permanent basis.

The present coöperative arrangement is, I believe, working well, and certainly it is receiving loyal and whole-hearted support from both the carriers and the shippers of the country. No

one could wish for any better coöperation than I have received from both of these sources, and spirit and morale are at very high levels. Moreover, it is possible, through the present arrangement, to realize many of the advantages of unit operation, as you will have noted from what I have told you today, and the possibilities in this respect have by no means been exhausted. In the circumstances I can see nothing substantial to be gained by changing the arrangement, and I am also sure that if we were to embark upon a program of government acquisition and operation, it would have an immediate demoralizing effect which it would take some considerable period of time to correct, besides introducing many troublesome problems in connection with the acquisition and the compensation therefor which would absorb the attention of many who now have none to spare.

The heartening thing about the whole situation is that it is beginning to get home to the people of the country, in fact it already has got home in large measure, that we are really in a war of tremendous proportions—by far the worst we have ever been in—that it cannot be won without an all-out effort on the part of every one, that there can be no business or living as usual, and that discomforts, sacrifices, and even serious hardships are inevitable. They are all ready to do their share, once they are sure that what they are asked to do is necessary, and it is our job in Washington to make that clear.

REMARKS BY THE CHAIRMAN

CHAIRMAN FRASER: Thank you, Mr. Eastman, for your comprehensive and authoritative review.

Ladies and gentlemen, those of you who did not read two or three weeks ago the series of remarkable articles in *The New York Times* written by Mr. Hanson W. Baldwin immediately upon his return from the Solomon Islands have missed an incisive report on decisive events.

Mr. Baldwin will address us now. He is a graduate of the Naval Academy. He served as ensign and lieutenant on active duty in our Navy, then turned to become a correspondent, a reporter and a commentator on military and naval events, a field in which he has few peers. Mr. Baldwin!

SEA-BORNE TRAFFIC—THE BATTLE WITH THE SUBMARINES

HANSON W. BALDWIN

Military Editor, *The New York Times*

IN scope of operations and continuity of effort, the German submarine campaign in this war has no precedent. Never before in the history of warfare has the *guerre de course*—war of attrition at sea—reached its present stage of development.

The first World War offers little basis for comparison. Then Germany was the sole enemy, and the combined fleets of Britain, Russia, France, Italy, Japan and the United States operated against the U-boats. Today, the strong sea powers of Japan, Italy and Germany are ranged against Britain and the United States and Russia. Twenty-five years ago, the war was limited in character and extent; today it is global; the world is the battlefield.

Then, Germany started the war with 20 U-boats, and reached her maximum potential with 140 submarines in commission in October 1917. The Reich started this war with some 70 submarines; today she probably has between 250 and 400 in commission and she may not yet have reached her maximum potential. Germany completed a total of 343 submarines during the entire first World War, constituting an average of about 6.7 submarines a month. In this war, she has probably constructed to date one and a half to three times that number, and conservative estimates put the output of her yards at 10 to 20 submarines a month. And to the German undersea fleet must be added the large flotillas of Italy and Japan.

In the first World War, 11,153,000 tons of world shipping were sunk by the submarine, and probably a greater tonnage was damaged. One third of the British Empire's merchant shipping was destroyed. In this war, these figures probably already have been exceeded; we know that in Britain alone 140,000,000 gross tons of merchant vessels—or some 35,000 ships—have been repaired or refitted since the war began. The blackest days of the worst months of 1917, when almost

900,000 tons of shipping were lost in one month, have more than had their counterpart in this war; last winter and spring, the rate of ship destruction was far greater than the rate of ship construction, and worse—at times—than in the blackest months of the first World War.

The increase in numbers of the German U-boat flotillas is only partially responsible for the greater toll. The submarine of this war is a very different instrument from the submarine of the first World War. It is no larger; indeed, naval designers have discovered that a submarine of medium size—650 to 1,350 tons displacement—is preferable, because of its better maneuvering qualities, to the giants of the *Surcouf* and *Argonaut* types. (The *Surcouf* was the French submarine which was lost, as you may remember, in collision some months ago, and the *Argonaut* is an American mine layer of about 2,700 tons displacement.) Most of the German U-boats of this war have been of about 750 tons displacement; yet these little craft—so great have been the strides made in engineering in the past quarter of a century—are far more efficient instruments of destruction than vessels twice their size of twenty-five years ago.

The modern U-boat is strong; its pressure hull is probably seven-eighths of an inch or more in thickness; it can submerge to depths as great as 400 to 600 feet. Contrary to popular impression, it has no need for American bases, or fuel dumps on this side of the ocean; it can cruise 12,000 to 15,000 miles or more and remain at sea for three months without touching shore for refueling; its endurance limitations are not the amount of Diesel fuel in its tanks, but the strength and physical condition of its crew. Submerged speed is still about the same as it was in the days of the first World War—9 to 11 knots maximum. But surface speeds have been greatly increased, and the modern submarine can easily reel off 18 to 22 knots on the surface—a speed greater than that of most converted yachts and other types of patrol craft which proved useful antisubmarine vessels in the first World War, but are of limited utility now, because of the submarine's improved speeds.

We had occasion to discover that last winter when many of our slow-speed vessels, the British trawler type and some of our converted yachts, were used in escort and convoy work along

the Atlantic coast. German submarines have conducted most of their attacks at night, obviously to escape detection from the air, and in several instances tankers which were escorted by these slow-speed vessels off Hatteras were attacked at night by German submarines which came in at high speed, 21 knots or more on the surface, launched a torpedo at the tanker, set it afire, and escaped before the slow-speed trawlers or converted yachts could do anything except fire a few ineffectual rounds.

So strong is the modern submarine that conventional depth charges—that is, those containing 300 to 600 pounds of TNT—must be dropped closer than fifteen feet to the submarine's hull if destruction of the under-sea marauder is to be regarded as certain. Indeed, there has been at least one instance in which a depth charge has bounced off a submarine's hull and then exploded nearby without destroying the submarine.

Most German submarines—and for that matter, most of the world's submarines—still use the conventional propulsion systems of first World War days: Diesels for surface cruising, electric batteries for submerged propulsion. Some German ships may have been fitted with the still incompletely developed so-called oxygen-hydrogen engine, which was first tried out before the war. This new engine has not been very successful; the weight of the necessary compressors more than equals the weight of the batteries they were intended to replace, and the high pressures of the new engine increase the normal hazards of submarine operation.

The torpedoes of the modern submarine have also been materially improved. Many are of the so-called "electric" type, powered by batteries, so that no telltale wake of air bubbles is left on the surface—and death approaches literally unseen. Some are probably of the magnetic type; that is, they do not have to strike the target to explode, but are detonated—like the magnetic mine—by the magnetic field of the target, and explode in the most dangerous position—beneath the hull of the target ship.

The mines which submarines lay are also greatly improved versions of the mines of first World War days. Not only do the minesweepers of today have to contend with the contact mine, which explodes when struck by a ship's hull, but there are

various other types. The magnetic mine, which may be activated by the passage of a ship, or the repeated passages of ships above it, is one of the newcomers in attrition war at sea. The acoustic mine, detonated — literally — by sound is another. This mine's detonating apparatus is energized by the sound of a ship's propellers above it. The passage of one ship may be enough to set it off, but there is an infinite variety of combinations; sometimes fifteen or twenty ships may pass above it with no damage, but the beat of their propellers will gradually "energize" the detonating apparatus until at last the danger point is reached and unpredictably, unexpectedly, the mine explodes.

These new devices, of course, pose great problems for the defense. Not only must every seagoing ship be equipped with the so-called "de-gaussing" belt to protect it against magnetic mines (the installation of this apparatus in itself produces some very interesting technical problems), but mine sweepers today are far more than that; they are powerhouses of a sort, and noisemakers. Not only must they sweep for anchored contact mines, with the conventional mine-sweeping gear of first World War days, but they must also drag an energized loop of cable through the water to set off the magnetic mines lying upon the bottom, and they must "sweep" channels for acoustic mines by utilizing an underwater trip hammer, or other noisemaker. So complicated and devious are the new ways of attrition war at sea, that upon occasions it has been considered necessary to sweep channels as much as eighteen or twenty times before an important convoy is allowed to make its sortie from port.

This strengthening of the offense in the *guerre de course* at sea, which has had its counterpart on land in the German blitzkrieg tactics, is not the sole cause, however, of the greater successes of the U-boat in this war.

Today, Germany has bases along the entire face of western Europe from which her submarines may operate; indeed, French and Norwegian bases are more important operationally, in the submarine war, than German bases. And today, it must be reemphasized and reiterated, this is global war, total war — and total war, by its very nature, can never be limited. (That, incidentally, was Germany's great mistake; she started by trying to conquer Poland; she will end, crushed by the world.)

The submarine war shows this totality of the modern nature of war more clearly than any other type of warfare.

In 1939 and the early months of 1940, German submarines concentrated their depredations in the North Sea and around the British Isles. As the British instituted the convoy system and an effective air patrol of their coasts, the U-boats were forced further to sea—westward of the British Isles. Gradually, as the trans-Atlantic convoys became better organized and long-range patrol planes swung further and further to sea, the submarines concentrated their operations in mid-Atlantic. Then, they pushed southward toward the route between Britain and Gibraltar; when Greece was conquered they entered the Mediterranean. When this country entered the war a swarm of them, like the destructive plague of locusts, descended upon our coast. As the defenses of the east coast became stronger and the convoy system was extended to this area, the U-boats were pushed north to the Gulf of the St. Lawrence and south to the Caribbean and the Gulf of Mexico. When these areas were strengthened, the main German effort was then transferred to the northeast coast of South America, the west coast of Africa and the Cape of Good Hope area—where German submarines in considerable numbers are now operating. At the same time, U-boats, grouped in so-called "wolf packs", have again concentrated in mid-Atlantic—and of course along the Murmansk route—to intensify their attacks upon the vital arteries of our war effort, the transoceanic shipping lanes.

Before the war is ended, German submarine attacks may literally extend around the globe. For that is the nature of total war; it cannot be limited or confined; if the conflagration is smothered in one sector it will burst forth in another.

And that, too, is the nature of submarine war; that is why the U-boat, harried and hounded, will nevertheless remain a menace until the war ends.

The German submarine war against our own coasts started in the middle of last January and will undoubtedly continue until this great global conflict is decided. When it started the Nazis had picked a weak spot, and they knew it, and there is not much doubt that the government underestimated the Nazi submarine's strength and capacity. The antisubmarine organ-

ization of the east coast was a paper one; many of our destroyers and subchasers had been sent abroad or to strengthen the trans-Atlantic convoy routes; the demands of the Pacific had drawn destroyers away from the Atlantic, and coastwise shipping was thus a shining mark. At the time of our entry into the war, the headquarters of the Eastern Sea Frontier, then known as the North Atlantic Coastal Frontier, in New York consisted of three reserve officers, and Vice Admiral Adolphus Andrews, commanding, had under his command only a handful of planes and ships. Today, there are several hundred officers on Admiral Andrews' staff; a great control room, of which the central feature is a magnetic map of the Eastern Sea Frontier, functions day and night and from it are controlled the scores of convoys, the hundreds of planes, the thousands of ships and small boats, and the scores of thousands of men who now fight the submarine from Maine to Florida.

The defense of our coasts against the marauders of the deep is divided into sectors—known as sea frontiers. The Eastern Sea Frontier—most important of them all, because from it depart the European-bound convoys and through it is bottlenecked most of the shipping to the great ports of America—is commanded by Admiral Andrews and extends from Maine to Florida. The Caribbean is commanded by Admiral Hoover, with headquarters in Puerto Rico, and the Gulf coast is commanded by Admiral Kaufman. The west coast is divided into two sectors; the southern sector is commanded by Vice Admiral Greenslade with headquarters in San Francisco; the Washington coast and the Alaska-Aleutian area and the convoy routes to Alaska are commanded by Vice Admiral Freeman.

The east coast, the Caribbean and the Gulf have borne the brunt of the submarine's depredations, for the Japanese have chosen to use their submarines for combat duty with their fleet, and their only excursions to our coastal waters, chiefly confined to the Gulf of Alaska, have been transitory and of relatively little consequence. Technically, numerically and in the production and organizing ability necessary to maintain a continuous and intensive *guerre de course*, the Japanese probably have only a small part of the German ability, though the Japanese submarine has been put to effective use against our combat ships in the eastern and southern Pacific. The Italians

have also shown a very limited skill in submarine warfare against commerce, and though a number of their vessels have been operating in the Atlantic under general German direction, they have accomplished, as far as is known, only a small part of that which the Nazis have accomplished.

Nevertheless, there has been, since December 7, 1941, a constant threat to both our coasts, and in a year's time, we have progressed from a very bad beginning, when we were admittedly caught with grossly inadequate protection, to a point where today we have a slight but tenuous advantage over the submarine. Today, scores of thousands of officers and men handle hundreds of planes and ships of all types in coastal patrol and coastal convoy work; some 2,000 small boats under sixty-five feet in length supplement the patrol by larger vessels; blimps numbered well up in the two figures float above our coastal waters; nets and minefields have been put in place at harbor entrances and other strategic points; a complicated system of convoy control points and challenge ships has been set up and is in efficient operation, and a vast organization—in total personnel, probably almost as large as our old peacetime Navy—fights the submarine, and its eggs of death—the mine.

In its first attacks upon our coastwise shipping, the submarine scored such major and dangerous successes that we are still feeling the result today; fuel oil is rationed and shipping is short, partially because of the huge tolls of shipping taken last winter and spring. The first defensive measure was the establishment of an organization, the collection of personnel, ships and planes to meet the menace. May 14 marked the turning point. On that date the convoy system was first initiated on the Atlantic coast—in a limited and admittedly inadequate fashion, but it was a start. Later, about July 1, it was extended to the Caribbean and Gulf.

The curve of ship sinkings in coastal waters immediately showed a sharp drop. PC-boats (subchasers of two types, 110 feet and 173 feet in length), old and new destroyers, planes of the civil air patrol, Army planes operating under control of the Navy, and Navy planes and blimps kept the submarines down; improved acoustic and radio detectors helped to locate the enemy, and submarines were sunk, damaged, or so severely attacked that their effectiveness decreased.

July, August and September were good months—relatively speaking—in the war against the submarine—particularly good in coastal waters. Since the Atlantic coastal convoys were first instituted on May 14, thousands of ships have been safely escorted along the Atlantic coast, with a loss of only a handful. The menace to our home waters has been met—though submarines still prowl from Newfoundland to Trinidad—but the ship sinkings still continue high on the Murmansk route, and the trans-Atlantic convoys are again being attacked by “packs” of Nazi underseaboats. (At one time, the Germans maintained an average of about ten submarines a day off the Atlantic coast; there are not that many now, but there are still believed to be anywhere from 75 to 100 at sea in the Atlantic.)

Just how many submarines have been sunk it is impossible to say. On October 20, A. V. Alexander, First Lord of the British Admiralty, estimated that 530 Axis submarines had been sunk or damaged since the war's start. This is obviously an inexact figure; in fact, not much better than a “guesstimate”, and to this observer, it sounds far too high, despite the importance of the plane as an antisubmarine weapon and the improvement in detection devices. But if it is accepted at face value, it would mean that an average of something like fourteen submarines a month had been sunk or damaged. Even if this average rate of submarine destruction be accepted as a correct average—and again it must be emphasized, it appears to be much too high—it obviously has not been enough to cripple the U-boat fleet. For the strength of that fleet has increased, and its operations have been far extended, since the war's start.

The answer to the submarine today is quantitative, as well as qualitative. We need more antisubmarine ships and planes and will continue to need more until the war ends. The convoy system has required great numbers of destroyers and subchasers and planes and blimps; there have never been enough left over to form adequate “hunting groups”, whose duty it would be to take offensive—not defensive—measures against the submarine. The hunting groups are usually composed of three or more destroyers operating together, and using their acoustic detectors, and Radars, they are sent out to a place where contact has been made with a submarine. Instead of being limited to defense of a convoy against submarine attacks, they continue to

hunt in the area of contact, trying to establish a continuous contact with the submarine through their detectors and using measures to keep it below the surface and destroy it. These measures, if they can be carried out by enough hunting groups, strike very heavily at the morale of German submarine crews, regardless of whether or not you actually sink the submarine, because the submarine is subjected to continuous and intensive depth charge attacks. Some of these hunting groups have been formed and have operated with success, but there have never been enough of them.

And it takes time to train green men—fresh from the farm or street corner—in the complicated job of operating an "Asdic" or laying down a lethal pattern of depth charges.

Though the submarine menace has by no means been scotched, there are at the moment three encouraging factors:

1. The rate of ship construction has slightly exceeded the rate of ship destruction during some recent months.
2. Although no reduction in the number of enemy submarines has as yet been noted, some deterioration in the efficiency of their crews is evident.
3. The bombardment of Germany and German-occupied Europe—if it is intensified and extended, and that should be underscored—must sooner or later have a slowdown effect upon the production of Diesel engines and of submarine hulls.

REMARKS

CHAIRMAN FRASER: We are indebted to you, Mr. Baldwin, for a lucid exposition.

Mr. Baldwin has told us something about the destruction of ships. We shall now hear something about the construction of ships. The next speaker is a graduate of the "School of Hard Knocks". He moved from that to the "University of Harder Knocks", and today he is busy administering hard knocks to the Axis.

He is a symbol of one of the things that America is fighting for, "The Land of Opportunity", where the man who has got it gets the chance to show it.

In introducing him to you, I would like to correct a misapprehension. This producer is not a Californian, although California claims him. The truth is that he was born in the greater state of New York.

MR. HENRY J. KAISER: I have almost forgotten what I was going to say, because I have been so interested in the previous speakers and what they had to say. I have really been thrilled; it is a great message for all of us.

Off the record and before I read the paper on "Ship Construction", I want to make a few remarks to you personally. I want to tell you, first, that I would like to take you on a little journey into the lives of a few others and, perhaps, into my own life.

I have been called a wizard, a wonderman, a miracle man, a magician; and of all of the things that I have been called—I have been called some other things I won't mention [laughter]—I like best the word "magician". I like best that word because I know that a magician does not do things alone. He always has with him somebody who helps him do the tricks. He takes all the credit, but the other fellows who do the tricks are the ones who really count.

I have with me one of those fellows who helped do the tricks. You will soon see rise before your eyes a Liberty Ship, 10,500 pounds, built exactly as we build them in the pieces and the sizes, assembled here. Nothing that I could say to you in a paper could make you visualize so clearly how 10,500-ton Liberty Ships, with the 9,000 items that go into them, can be built in such a short space of time.

It is not only the helper who is with me that makes this possible, but there are literally thousands of others who really do the work. I merely take the credit. That is why I like this term "magician". This is all off the record! I would rather get the credit. [Laughter]

There is a speaker to follow me who represents our government, and I want to say something serious which I really feel down to the very depth of my heart. I really feel that our government and the

men in our government, particularly the Assistant Secretary of War here today, Robert A. Lovett, do not get the credit to which they are entitled.

I happened to be in Washington once or twice. I worked with these men and I know how they think and I know how they feel. They give everything they have for America, and I am thrilled to see how they coöperate in doing the things which they want to do. There are times, however, when they may feel just like you do here. I want to tell you a little story about Mr. Robert A. Lovett.

One day I had occasion to be in the office of the Secretary of War, and the Secretary had on his desk one of these little speakers that enable you to press a button and talk to one of your assistants or one of your associates. In this case he was talking to his associate, Mr. Robert A. Lovett, and he said, "Henry Kaiser is here." Back boomed the word over this little speaker, that was just as loud as the voice of the man who had sent the message, and it said, "Oh, my God!" [Laughter] And so I won't blame you if you all feel that way when you get through listening to this little paper I am about to read to you.

(Mr. Kaiser then read his paper, which follows.—Ed.)

NEW SHIP CONSTRUCTION

HENRY J. KAISER

President, Henry J. Kaiser Company

AMERICAN business owes a heavy debt to the academies. Without the library, the laboratory, and the organization of knowledge, our progress in the release and utilization of energy would have been greatly retarded.

Perhaps the whole process of modern production on which our safety and security now rest should be considered as a tricameral effort: first, the House of Discovery, manned by scientists and motivated by the desire for knowledge for its own sake; then, the House of Invention, where the findings of research are channeled into utilitarian and serviceable forms; finally, the House of Production, where again the findings of science and the devices of invention are combined with experience to produce and employ all of the forms of wealth on which our civilization depends. Surely, it is good that the American academies have so generously recognized the manifold skills of our people and have not hesitated to recognize that higher learning and practical experience are complementary forces.

Notwithstanding the tragic necessity under which we labor today, I know of no more quickening experience than the spectacle of America's war production effort. At the risk of indulging in a superlative, it can safely be said that there is no parallel record of production from the standpoint of quantity, quality, variety and speed. I wish there were time to sketch this picture from the inert raw material to the finished product, and to pay tribute to each and all who have made this surpassing endeavor possible. But since you have focused the attention of the annual meeting on the problem of transportation and have asked me to present one phase of this tremendous service in the short span of twenty minutes, I shall attempt to present a brief series of contrasts between shipbuilding in World War I and World War II.

Between August 10, 1916 and May 7, 1921—approximately four years and ten months—there were constructed 238 ships of

8,800 dead-weight tons. The fastest time accomplished on the ways was 34 days, and the average time, 167 days. The fastest time required for outfitting was 14 days, and the average, 73. For the total time between the laying of the keel and the delivery of the ship, the fastest record time was 52 days, and the average, 240 days. Between April 14, 1941 and September 30, 1942, a period of seventeen and a half months, there were constructed 329 vessels of 10,500 tons and 55 vessels of 10,100 tons, or a total of 384 with the following record: Fastest time accomplished on the ways, 10 days; average time, 89 days. Fastest time required for outfitting, 4 days; average time, 33 days. For the total time between the laying of the keel and delivery of the ship, the fastest record to date is 14 days and the average was 125 days—an average production speed-up of 115 days over World War I. One hundred and fifteen days! I wish Hitler could know that.

A great many factors have combined to make possible this record. Without attempting to arrange them in any order of relative importance, here are a few of the more outstanding. Perhaps the most revolutionary of all of the improved devices is the use of welding instead of riveting. During World War I it was necessary to drive approximately 650,000 rivets on a single ship of the type I have just mentioned. This process had to be followed by caulking and every rivet had to be tested for leakage and breakage. In our present effort the introduction of riveted frames and welded seams and butts calls for approximately 228,000 linear feet of welding and only 24,000 rivets per ship.

In World War I the ships were built piece by piece on the ways. Very little prefabrication or pre-assembly was employed, with the result that the shipyards were seriously congested. Today, a shipyard covers miles where it formerly covered acres. Immense areas are devoted to prefabrication, pre-assembly and sub-assembly, which permits huge numbers of workers to concentrate on particular tasks with all of the advantages which such specialization affords.

Today, we employ immense indoor assembly shops with many individual bays, each serviced with overhead cranes. In World War I, the cranes in the shipyards had a capacity of five tons and it is safe to say that nothing heavier than five tons

was ever lifted by any crane in the erection of a ship. Now, we are using cranes which handle sections weighing up to two hundred sixty tons, and greater capacities are in prospect.

I am aware that the technicalities of production equipment are out of order in a brief survey of this kind, but I believe it is justifiable to mention some of the many types of new equipment and machinery which have been introduced since World War I, to permit the full utilization of prefabrication methods and to insure the speed in production which has thus far been attained, for which there is promise of substantial increase in the near future.

The flame planer: This is an oxyacetylene torch mounted on a motor-driven bridge which cuts and/or bevels four sides of a plate simultaneously, parallel, and square.

The radiograph: A portable, motor-driven, oxyacetylene torch which cuts circles or narrow parallel strips with square or beveled edges.

The travograph: This is a device which mounts four torches on a motor-driven traveling bar, which cuts parallel straight lines or follows magnetic patterns.

Bulldozer on bending slab: A horizontal pneumatic ram for bending heated shapes to a template.

Four hundred ton joggling press: A vertical hydraulic ram operating against separated horizontal fixed bars, for bending heavy keel plates, etc.

Thirty-two foot bending rolls: These are designed to bend flat plate.

Bridge cranes: These are traveling gantry bridge cranes for transporting complete prefabricated superstructures up to 260 tons on the ship.

Truck cranes: These are revolving cranes with a long boom, mounted on many rubber-tired wheels. They are very maneuverable.

Large trailers: Multi-wheel carriers of 60 to 80 ton capacity for hauling large prefabricated sections.

The pantograph: A mechanical flame cutting device.

The introduction of an Engine Mock Up Room permits the

prefabrication of all of the piping for the engine room ahead of time. This eliminates congestion in this area of the ship during construction and greatly facilitates assembly.

One of our great executives in the nation said to me in visiting one of our yards, "Well, Mr. Kaiser, you are cheating", and so I took him through the various yards. When we came to the assembly line where there was a long line of trailers, he turned back to me—and you all probably know who he is—and he said, "Well, it is good cheating."

Through the utilization of special jigs which are in effect the tools which guide cutting tools, we have been able completely to prefabricate double bottoms, fore peaks, after peaks, amidships deckhouses, afterdeck houses, shell assembly sections, bulkheads, and second and upper decks. These terms are not as technical as they sound, which you will very shortly see. Actually, they are descriptive of the ordinary parts of a ship's hull and superstructure. To be able to make them all in separate units, as the automobile manufacturer makes radiators, chassis, bodies, doors and wheels, permits the employment of assembly methods which so far outstrip the former procedures that a tremendous economy of time is assured.

But the new records, which are sometimes characterized as unbelievable, could not have been established without well-planned and farsighted purchasing schedules. As soon as the preliminary plans and specifications are available, purchasing begins and materials are assembled far in advance of actual construction. This is only one of management's functions, but it is typical of many features in the operation of modern production.

I seem to have been emphasizing technique and material. Actually, the biggest job in the high-speed production of ships is the training, protection, encouragement, and—if I may use the term—inspiring of the labor force. Sometimes I have grave misgivings about this term, "labor relations". There is a strong tendency to deal with it in an utterly theoretical and non-realistic way. Labor relations are human relations. Nothing more or less. When a man is treated like a human being; when his ability, skill and good will are properly recognized; when his ambitions and his anxieties are given due and just consideration, he is capable not only of superb loyalty but

of performing veritable miracles of production. Given a task which reasonable men believe can be accomplished, there is no obstacle which American labor will not overcome, provided labor relations are based, not on paternalism and bounties, but on human understanding and mutual respect.

To this end, a number of radical departures have been introduced in the shipbuilding industry. Women are now employed as welders, riveters, burners, tool checkers, draftsmen, and in many other capacities. The adoption of a seven-day week with three eight-hour shifts per day, and the elimination of Sunday as a holiday by allowing each worker one day off in seven, mark a great advance over the schedules which prevailed in World War I when a six-day week obtained with two eleven-hour shifts per day, and skeleton crews worked on Sundays. In World War I labor was often paid on the piecework basis. Now we employ union labor and there is no need for a bonus incentive.

But perhaps the most outstanding advance is the introduction of training schools where there is continuously under instruction a vast army of potentially expert artisans: welders, builders, shipfitters, shipwrights, mechanics, machinists, and virtually all the other essential skills.

Wherever it is possible, the work on small items and equipment is passed on to subcontractors, not only for the sake of efficiency, but with the direct intention of aiding the so-called small business enterprise to the fullest possible extent.

I wish there were time to review such fascinating aspects of the task as the flow of work from one process to another. Efficiency, economy, and the fair consideration of every worker on the production line make this almost a profession in itself. One instance will illustrate the point: We now employ a whole staff of expeditors whose principal duty it is to prevent bottlenecks in production. We dare not permit the process of assembly to be slowed down or stopped by the failure of some division adequately to supply essential parts. High-speed mass production calls for a coördination, perhaps not so majestic, but in a general way comparable to the coördination within the human body. Everything must work together. Such coördination in industry does not just happen. It is the result of devoted planning, the constant application of intelligence and

skill, but it leans heavily upon the exercise of the social virtue which we all recognize in the term "coöperation". Perhaps wartime production is giving us the most superb demonstration of the ability of the human family to work together when they have a compelling cause, a vital objective, something to which they can literally give their lives.

I did not come to forecast the future possibilities of production in this special branch of war transportation. It is a fact that we have built a 10,000-ton ship in ten days from the time the keel was laid, equipped it in three days and three hours, and delivered it just short of fourteen days, ready to be loaded and to take its place in the convoy of vital war supplies. I am convinced that we can improve this record soon. We are learning by experience every day; our morale is rising; the superb qualities of human character are responding to a challenge. It is conceivable that we can build, equip and deliver a ship within a week of the time the keel is laid. Our organization, including management and labor, is now building over nine hundred ships of many types in our eight yards on seventy-two shipways. We will deliver 317 Liberty Ships and 25 British Type Victory Ships in the year 1942. By the end of this year there will be 200,000 men regularly employed in our yards.

Now this is off the record. I have a telegram, a part of which I would like to read to you, because it represents the spirit of which I have just spoken. On Monday the men started with a Liberty Ship under improved prefabrication methods. Monday was 12:01 midnight. This is Tuesday, isn't it? That ship has its top decks on at this time. Within the week, it will enter the waters of the Pacific. You will soon hear the number of days. I cannot tell you what they will be, but I can tell you what started it.

Someone said, it is a publicity stunt, but it is not. If I felt that it was only that, if I felt that it was not something that reduced the man-hours and that increased the production of our ships with fewer man-hours, I would not think that we were accomplishing much.

I did not know that this ship was going to be done at this time, and when I heard about it, not from the yard which was doing it but from another yard which was a little bit concerned (it was a yard of our own, it happened to be my son's yard), I

wired the manager of the yard and I asked him what caused him to start this ship in this way. Here is his wire, it is dated yesterday :

It all started as the result of the popular demand from the yard after the launching of the ten-day boat at Oregon Shipbuilding Corporation. More than 250 letters [do not talk to me about the inefficiency of American labor when you hear this] were received in my office containing suggestions to improve our prefabrication and production methods [are'nt you proud of the American people when you hear that?] and making suggestions as to how even a ten-day record could easily be surpassed.

We have a little magazine called "Fore and Aft." When we came from the launching of the ten-day ship I rode on the train with one of our managers. He got off at one point, and when he returned, he said, "I just sent a telegram to change the front page of our magazine to say, 'What has Oregon got that we haven't got?'"

Many of these suggestions were prompted, of course, by the "What has Oregon got that we haven't got?" card that was published in "Fore and Aft," and after careful study, a program was made combining the best ideas that had been presented, principally ideas tending to increase the amount of prefabrication.

The popularity of the erection of this boat is indicated in the number of men who stayed over from the previous shifts to watch the keel-laying and by the difficulty we had in clearing the men from other shifts and from other ways from the site of the work to permit maximum safety with minimum risk. There was some over-excitement at the keel-laying which was calmed down in a short time and the men got into the steady rhythm of meeting the production schedule.

At one time the interest was so great that it became necessary to make an appeal to the men in the yard over the loud speaker system that only those supervisors and workmen assigned specifically to the job should be at the building berth of the prefabricated boat, as it was evident that the men were coming to work from one to two hours early in order to watch the operation, and although the educational feature was considered outstanding, nevertheless, safety was considered to be of prime importance.

This telegram was sent to me by the manager of the yard, as a result of an indirect request to somebody else to tell me exactly what had happened in the yard. I can almost see those boys as if they were on a football team, dancing and prancing, ready to go, and that is the spirit that will win this war, the spirit of industry and the spirit of American labor.

I cannot forego this opportunity to say that it would be a tragedy of immeasurable consequence if so magnificent an effort were to be solely dependent upon a state of war. Every day I

hear solemn pronouncements and dire forebodings about the future. I have the impression that there are men and women today who actually fear the coming of peace. I am told that war alone has made possible full employment in the modern world, where all other attempts have failed. I am informed that the day peace is declared we will enter on a period of economic disaster, the consequences of which may be more dreadful than the devastation of war.

I do not share in these prophecies, but if there is any truth in them, what a solemn indictment they lay on civilization itself. What an unspeakable evil we would face, if we were forced to admit that the rank and file of mankind cannot enjoy opportunity unless the world is at war. The builder is necessarily a realist. When you grapple with materials and physical forces, great stores of energy translated into utilizable power, when you attempt to relate human abilities to these forces and these materials in the effort to control the flood, to harness the river and the tide, to transport natural gas from the well to the city a thousand miles away—to do any of the majestic and noble things which fall to the builder's lot, some considerable measure of realism must be your portion. But I have lived long enough to see men do the impossible, not once, but many times. And in the actual physical demonstration of man's ability to overcome the barriers, the obstacles, the handicaps, and even the deliberate and considered obstructions thrown up by his fellow men, I have faith to believe that we need have nothing to fear in the advent of peace.

On the contrary, the peace which eventuates from this so-called global war would present us with an opportunity unparalleled in the history of mankind. Today, all our powers are directed toward the creation and utilization of instruments of destruction. Our present business is to destroy the destroyer. This is a condition of survival, to which we can do nothing but submit. But how can we ignore the demonstration of creative power which this monstrous calamity has called forth? Perhaps man has never more fully proved his true nobility than he does today with his back to the wall, fighting for the survival of every worthy value which civilization has achieved. There is not the slightest shadow of a doubt about the victory, but if that victory over the aggressors is to end in defeat at his

own hands, he will write the most pathetic chapter in human history.

The limitations of your program properly exclude a discussion of post-war production and I am sufficiently schedule-conscious to be aware of the rights of those who follow me on this morning's program. But in the three minutes remaining of my twenty, let me say, first, that there need be no post-war depression; there need be no wholesale unemployment. The business of rebuilding a war-torn world and restoring a war-drained economy could keep every wheel of American industry and every acre of American agriculture fully employed for twenty years. Against every statement of such a faith, there are a thousand objectors ready to pronounce disaster and doom. But such pessimism ill fits the temper of the American mind and spirit. The country was not built on the doctrines of defeat. In the more than a century and a half of the history of the commonwealth, we have from time to time wrestled with frontiers, with political evils, with financial disasters, with earthquakes, fires, floods, droughts and wars—both internal and external—and the nation was born in a revolution. It has lived its life through more major social upheavals than many of its elders in the family of nations, but when the trend line is traced through the peaks and the troughs, it has always been up. Not once in our entire history has that upward trend been reversed. With pardonable human frailty, we have laid our reverses on the shoulders of everyone except ourselves and we have fiercely denounced the stupidities and evils of all of the parties in the opposition. From time to time we have been little, in a setting where all the props called for greatness. But there ought to be great comfort in the fact that we have never been defeated by anything.

Now we are called upon to be not only the arsenal but the fortress for human freedom. For the moment, we are living in a fortress economy where everything is pooled for the common need. When peace comes we can play a great rôle if we dare and we need have no apology to offer for the fact that our outstanding contribution will be the ability to organize production. I have ventured to call the right to produce, the Fifth Freedom—for without it, the other four have small chance of survival. It is not too soon for the participants in and the

defenders of American enterprise to begin to plan for the rôle which fate has decreed that we shall play in the post-war world when we shall in very truth be the supplier of equipment, the source of food, the reservoir of capital, for many of the countries on which the war is laying its scars. I am aware that this will take statesmanship of a high order; that it will call for the reconciliation of very basic human and national characteristics; that it may take a type of courage not yet displayed even in the heroics of warfare; that it may present us with an entire series of heretofore unknown problems. But again I say—I have seen men do the impossible, not once, but often, and I throw my lot with those who hold that the war has proved once and for all that there is no issue in peace or reconstruction which cannot be met.

It is therefore our high hope that we shall shortly enter on the period of our greatest productivity, of the maximum utilization of our energies and our skills, and—what is ultimately more important—on the fulfilment of our destiny as a nation that serves the cause of human freedom in all of its manifestations and in the full measure of idealism which is consonant with our human capacities.

DEMONSTRATION OF SHIP CONSTRUCTION *

MR. KAISER: This is Mr. David Oppenheim, one of the magician's assistants. He will now show you the Liberty Ship.

MR. OPPENHEIM: We start with the ship and, instead of laying the keel, we will lay the whole double bottom at once. Here is the double bottom section which is made up of the tank top and the bottom shell and the floors and the vertical keel, all complete in one. This is the next section. This is all the double bottom of the ship.

MR. KAISER: How long did it take on this ship to do this particular section?

MR. OPPENHEIM: It took about four hours.

Now we start with the shell assembly. It is made up of a shell completely assembled. This is a transverse bulkhead. This is another transverse bulkhead.

* Although it is impossible to reproduce in these pages the remarkable demonstration with models of the construction of a Liberty Ship, the Academy desires to record in its Proceedings the interesting conversation between Mr. Kaiser and his assistant, Mr. David Oppenheim.

MR. KAISER: These are exact duplicates of the pieces that are raised by the cranes and put into position?

MR. OPPENHEIM: This is the shell assembly.

MR. KAISER: You would think that I knew something about this ship. [Laughter] All these pieces, as you will see later, are numbered. These are all side shells, all prefabricated; there are probably in storage eight or ten of them, and it is all repetitive operation.

MR. OPPENHEIM: This is your transverse bulkhead below second deck, here is another one. Now we start with our second deck. This is another section of the second deck.

MR. KAISER: Mr. Oppenheim, will you tell them where the ship is this morning, when you finish the construction? This is Tuesday morning, isn't it?

MR. OPPENHEIM: Yes. This is all the second deck.

MR. KAISER: You see, we are raising this ship on the coast. If we can do it faster, we will let you know.

MR. OPPENHEIM: This is the transverse bulkhead. Here is the longitudinal bulkhead; another one. A transverse bulkhead.

MR. KAISER: You see how the magician works. He gets the credit but he doesn't do the work.

MR. OPPENHEIM: Here is another bulkhead. This completes our second deck. Now, here is a section complete, with a stern frame, all welded in one piece; it weighs about ninety tons.

MR. KAISER: It was actually lifted in that condition and placed right there, and then merely welded.

MR. OPPENHEIM: Here is a fore piece, complete with the stem. Now we will start with our shell assemblies above second deck.

MR. KAISER: Mr. Oppenheim, being an engineer, is more accustomed to doing this on paper.

MR. OPPENHEIM: Now we continue with our upper deck. The upper deck is complete with winches. We can now place the aft-peak above the second deck in position, also the fore-peak above the second deck. This is still our upper deck. That is where we are right now, today.

MR. KAISER: You will soon hear in a few days that she goes into the Pacific and sails.

MR. OPPENHEIM: This is your afterdeck house, complete with piping and electrical work, with your gun mounts and everything.

It is placed in one unit, complete.

Now we start with our midship deck. This is a completely pre-fabricated section. The midship deckhouse is in four sections so as to permit us to lift it up, because the capacity of our cranes in that particular yard does not permit the lifting of the complete deckhouse which weighs about 250 tons. But we do have a shipyard in Vancouver where we can lift the complete deckhouse in one section. This is complete, with joinder work, with furniture in it, piping, and electrical work. The food is usually in it also. [Laughter] These are all completed units that fit like a glove.

MR. KAISER: These all travel on an assembly line.

MR. OPPENHEIM: These are the hatch covers. Here are a few lifeboats. These are the mast houses, complete with the booms and rigging. Here is the propeller, all ready to go. Here is the rest of it. Here is a stack and a few of the guns.

Now that took about seven minutes. We hope to build a ship very soon in seven days.

REMARKS

CHAIRMAN FRASER: Mr. Kaiser, Mr. Oppenheim, we thank you both for your remarks and for your demonstration. This, I believe, beats all the records for building ships, and I would like the privilege of christening this vessel the "Henry J. Kaiser".

Ladies and gentlemen, the next speaker already has been introduced by Mr. Kaiser. I should supplement that only by saying that he is a graduate of Yale, that he recovered somewhat by taking postgraduate work at Harvard, then entered the Navy in the last war in the Air Service, became a Lieutenant Commander, and won the distinction of the Navy Cross.

Today, he is back as Assistant Secretary of War for Air. He is a master of his subject, and I am going to ask him to present a paper on "Airplanes for Men and Freight in Wartime". Mr. Robert A. Lovett of New York.

MR. ROBERT A. LOVETT: I want to digress for a moment to assure you that my shipmate in the "Battle of Washington", Mr. Kaiser, if he heard the comment that he attributes to me must have recognized it as a prayer and not a comment on his agility as a magician. [Laughter]

AIRPLANES FOR MEN AND FREIGHT IN WARTIME

ROBERT A. LOVETT

Assistant Secretary of War for Air

MY subject today is "Airplanes for Men and Freight in Wartime". I should like to emphasize the *wartime*.

Air transports, or cargo planes, are vital members of the combat team of our Army. They are multi-purpose planes of our balanced Air Force, serving with both the Air Transport Command and with the Troop Carrier Command. Our transport planes are classified as "tactical" and are called "service-combat planes", which indicates their dual function, as compared with the single purpose plane, such as a bomber or fighter.

Transport planes are as vital to an air force as motorized equipment is to an army division. This fact, plus heavy shipping losses and the desire to find some quick solution of the problems thus raised, has fostered wild claims for air carriers and has, unfortunately, led to much loose talk, false hopes and misrepresentation of the transport plane's proper sphere and its possibilities. In the time available to me today I shall try to state the functions of military air transports, and the limitations of those functions, with as much impartiality as is possible from an ardent believer in air power and the future of air transportation. I have been sometimes called a fanatic about the air. I have not denied it, although I have had very much in mind the comment of Professor Santayana, who says that a fanatic is a man who redoubles his effort after he has lost sight of his goal.

Our transport planes are, as I have said, multi-purpose. They are extraordinarily flexible. The plane which is carrying ammunition from a reserve depot to a combat area today may be carrying paratroops over enemy territory tomorrow. They are specially designed for several uses—they have stiffened floors, wide doors and tie-down rings, to permit the loading of cargo such as engines, spare parts, supplies, special

equipment and the great mass of items that an air force and an army needs. But in addition to this, and in many cases of greater importance, they must carry combat teams in support of ground troops—air-borne infantry, parachutists, field pieces, special weapons, etc., which must be taken into the combat theater or over the selected target. Therefore, on analysis, their dual function actually has a single aim which changes in character only as the aircraft itself moves from its work behind the lines into a combat zone. It is obvious that troop carrier squadrons are compelled to develop special techniques; but it is equally apparent that the general problem of handling, maintaining and operating the planes is identical.

Transport planes today present a picture of limitless possibilities within their proper field and of disappointing limitations if they are improperly used. Unlike cargo vessels, whose function is limited by a shore line and whose operation of necessity must require reasonably safe unloading points, the army transport plane, whether serving as cargo or troop carrier at the moment, has no natural limiting barrier except its own range, and has as its specific duty in certain circumstances the job of bringing needed men or supplies into the battle area itself and either dropping them from the air or landing them on the ground. It is important to bear this essential distinction in mind in order to avoid falling into the trap of comparing air-borne cargo planes with sea-borne cargo ships. Their functions, their speed, their faults and their virtues are entirely different.

The tactical use of transports is, at this particular time, a matter which unfortunately we cannot discuss with frankness for reasons of military security. We can say, however, that to date we have seen only the beginnings of imaginative use. Press reports during the past two years have made the use of parachute troops a matter of common knowledge. It is likewise known that transportation of reserves and of supplies by air played an important part in Rommel's second Libyan campaign and did much to offset the effects of the Mediterranean blockade set up against him. Such examples are perhaps adequate to point out certain obvious military virtues of the cargo plane.

But all direct combat uses at present become relatively small compared with the amazing expansion of the use of our trans-

port planes to maintain vital supply lines to our fighting units now engaging the enemy completely around the world. A large portion of the public does not realize that our Army Air Forces are meeting the enemy in combat every flying day on nine widely separate fronts all around the world. In this global war the problem of supply and maintenance of weapons as fragile as high-performance aircraft would be quite impossible without the cargo plane and without the system developed by the Air Transport Command, which combines civilian contract carriers for the type of operation for which they are best suited, and military air transport squadrons in combat theaters.

While full details of these operations cannot be given at the present time, it is possible to give you a few figures indicating the scope and character of the operation. At one stage of Rommel's drive into Egypt the rapidity of his advance resulted in the destruction of certain ammunition stores of the United Nations. We were desperately short of anti-tank ammunition, and if the situation had not been corrected, the result would have been disastrous. The Air Transport Command delivered 25,000 pounds of anti-tank ammunition from this country to the front in Egypt in five days. In no other way could this have been done.

In the month of August (the latest fully tabulated figures) the Air Transport Command through its contract lines and its own personnel flew a total of 16,212,560,980 pound miles, exclusive of the African division on which a very large number of airplane miles are flown.

The above figures represent merely a small fraction of the amount of air transportation we shall be operating by this time next year. For some time past these planes have been going out loaded with weapons and supplies and coming back with strategic materials and military personnel. In the case of several strategic materials of small bulk, a high proportion of the amount imported is handled by airplane.

Dramatic as is the work done by the air transport plane, particularly in the magnificent pioneering operations where no other method of transportation exists (such as, for example, in some of our outposts to the North, the routes to the Middle and Far East, and the amazing job done against great difficulties in trying to make up by air for the cutting of the Burma

Road), its main contribution to the system of military transport in this war is that of a supplementary *express* service, not a substitute *freight* service.

The air carrier is today, and undoubtedly will be increasingly, an indispensable part of any military establishment. It has the essential virtues of speed, flexibility, multiple uses and elusiveness. It is the only existing method of getting certain supplies into some parts of the world—not just getting them in on time, but getting them in at all. Its very importance in such operations has misled large sections of the public into having false hopes and into the belief that air transportation offers a quick and easy solution to the logistic problems of modern war. It very definitely does not do this. It is, and will be for several years, an absolutely necessary highly specialized but complementary part of a transport system in time of war.

For some time to come, transport planes cannot, and will not, take the place of ships. There is, in fact, no good reason why they should. There is no need for us to go into detail as to cost per ton mile, consumption of fuel in relation to load and range and all the other statistics which have importance in peacetime greater than they enjoy in a war where necessity, rather than cost, rules. I believe the functions of cargo planes and cargo ships can be rather simply set forth by a hypothetical case, one incidentally, which we very frequently face.

Let us suppose that our problem is to move 100,000 long tons of supplies per month, under present wartime conditions, from San Francisco to Australia, a distance of approximately 6,500 nautical miles. How many planes of existing 4-engine cargo type will it take? How many cargo vessels will it take? How much personnel? Will we need tankers? And so forth. The following simple comparison will give these answers.

	Number	Crews	Fuel	Tankers
Surface Vessels	44	3,200 (including gun crews)	165,000 bbls.	-0-
(EC Type)				
Cargo Planes	10,022	120,765 (flight crews only)	8,996,614 bbls. (overseas requirement)	85 (large size)
(4-Eng.C-87 Type)				

I believe a study of this comparison will indicate some of the absurdities of the recent "air cargo as a cure-all" excitement in the midst of a war in which we will need all the supplies we can get by land, by sea, and by air.

A large army in this day of mechanized warfare requires an amount of heavy guns, ammunition, tanks, motorized equipment, and general supplies of a character, weight and bulk which does not lend itself to the limited cubic capacity of air transportation at this time. Moreover, the serious limiting factor in air freighters at present is their fuel capacity and its effect on their payload. This situation is slowly being improved but it will take several years before great improvement on long-haul cargo can be expected. A cargo vessel can carry enough fuel to get its load to the destination abroad and return home. At the present time the airplane cannot do this on long flights. Consequently, fuel has to be carried for it and spotted along the way or at its destination so as to enable it to get home. On one of our principal well-established routes of the Air Transport Command, with no very long hop involved, we have to send about one ton of fuel by sea to enable the planes to carry approximately one ton of freight by air.

Giant air transports of the future will probably reduce this fundamental deficiency. Such planes are, however, several years in the future and their safe development in the present state of the art requires growth by tested stages. Therefore, for the present and the next few years we must do everything we can to multiply the number of transports of existing types and the much larger ones about to go into production. This the Air Forces are doing and our goal is the maximum number possible without too great a reduction of combat planes during the time of limited strategic materials. From an initial rate of about one cargo plane to five multi-engine combat planes we advance in an orderly schedule until we reach a ratio, under present plans, of about one to two.

And now a word about gliders. The glider has certain tactical uses but it should be emphasized that they are very highly specialized. Because of the fact that they can be built with lighter wing loadings than are generally used in transport planes they can land at much slower speeds and, indeed, can

get into fields from which no normal take-off could be made. However, where take-offs and landings can be made from reasonably well-prepared fields by well-designed cargo planes with proper overloading, the use of gliders does not appear to add much to cargo operation. The total load with which a transport plane can take off and fly safely towing a glider is naturally less than it could carry without a tow. It seems at present that the load carried in a glider would normally be only a little more than enough to offset the load left out of the transport to enable it to tow the glider. It has been estimated by competent authorities that it would, on the average, require seven or eight cargo planes, each towing one or two gliders to handle the same total load that could be directly carried in ten similar airplanes without the complications of the trailing gliders and their crew. In summary, the glider has very special military uses but at present in transportation it is a special expedient for use in special situations.

It must be apparent that we cannot afford to neglect any method of transportation. You will not find any competent airman who is not an enthusiast about air transportation and who does not look forward to the days of specially designed large transport planes. Similarly, you will find none who wishes to do air transportation the disservice of claiming something fantastic for it. All of us in the business day in and day out believe that we have seen only small samples of the future of air transportation. Planes now on the drafting boards and in the factories expand the horizon almost indefinitely, and even larger specially designed air carriers will come when design, metallurgy and technique reach the proper stage. This is, unhappily, some years off and we must use in the war of today and tomorrow the weapons and means of today and tomorrow while research and experimentation, under the forced draught of war, bring us steadily nearer the magic carpet of the future.

REMARKS BY THE CHAIRMAN

(Mr. Shepard Morgan assumed the Chair.)

CHAIRMAN MORGAN: With your permission, I shall take over the command of this ship in the absence of Captain Fraser, who has been called away.

It is a time-honored practice of the Academy to have a few moments of discussion after the close of the papers. Now, if there be any discussion, I suggest that we start it according to these rules: first, that any person disposed to discuss shall give his name and his connection, if any; and second, that he limit his words to as brief compass as possible in order that we may adjourn promptly over the lunch hour. Do I hear any discussion?¹

¹ Space limitations make it impossible to print in these Proceedings the interesting discussion by several members who spoke from the floor under the ten-minute rule.—ED.

PART II

THE ARMED FORCES—THEIR MOVEMENT AND SUPPLY

INTRODUCTION *

SHEPARD MORGAN, *Presiding*

Vice President, Chase National Bank of the City of New York
Trustee of The Academy of Political Science

THE meeting will please come to order.

In opening this session of the Academy it is appropriate that we remember once more that the Academy of Political Science was the idea of a soldier. It occurred to him on a battlefield of the Civil War. His thought was that if men understood each other, there would be a better chance for peace in this world and less likelihood of war. Some seventeen years after the close of that great struggle his idea came to fruition in the Academy, which is dedicated to the faith that knowledge and reason furnish the solvents for social differences, even for war itself.

The United States is now in the heat of the world's greatest war. Its soldiers and sailors are fighting on nine fronts—fronts which girdle the world. The distances are very great, yet over them we have got to move immense armies. Indeed, we have moved large forces already. All must be supplied with material in unprecedented variety and volume, and this material must be constantly replenished so as to keep the fighting forces at the highest pitch of efficiency. All this imposes on the administration of the Army and the Navy a task of transport which in distance, size, and time permissible for its accomplishment adds up to something completely new in warfare. Yet our Army and Navy are doing it, and against all the obstacles our enemies can interpose.

* Opening remarks at the Second Session of the Annual Meeting.

The size of the task is one of the prices we pay for living in the twentieth century. Not only are the armies of today larger than ever before but the material they need is heavier, bigger, immensely more complicated. For this is not only a war of distances but a war of machines. Evolution in the arts of war has fully kept pace with evolution in the arts of peace, and just as our peacetime life has steadily grown more complex year after year, so also has the whole business of war put progressively greater loads on our entire system of production and distribution.

I wonder how many of you have seen a remarkable book by a Russian historian published in this country a year or two ago. It is Michael Prawdin's memorable history of the Mongol Empire. One can deduce from it the point that the amazing success of Jenghis Khan in conquering Asia from the Pacific to the Black Sea was due not alone to his strategic plan and the hardihood of his Mongol horsemen, but to what we would now call his services of supply. These, in comparison with what modern armies employ, were simple, but they were highly efficient. I quote two descriptive passages, one dealing with the equipment his men carried, the other telling how they managed to cross in mid-winter one of the highest mountain chains in the world. The period is in the years 1218-1219.

The first is this:

The soldier must have in his kit, not only what he required for actual fighting, but also needles and thread, and a file for the sharpening of arrow-heads. There must be a shirt of strong, raw silk for the man to put on before going into battle, for such silk is not penetrated by an arrow, but driven into the wound, and the Chinese surgeons were able to extract arrow-heads, even when broken off, by pulling the silken fabric out of the wound.

Although the army consisted mainly of cavalry, it was accompanied by a heavy artillery train. Upon yaks and camels were laden (carefully taken apart for transport), not only mangonels and catapults, but also... flame-throwers and cannons, to ignite wooden towers and overwhelm the defenders of fortresses with a hail of stones and iron.

Each rider had three spare horses. His weapons were designed both for close combat and for fighting from a distance. He carried a bow, two quivers with various kinds of arrows, one of the quivers being ready for instant use, and the reserve-quiver sealed against damp. Then each man had a javelin, or a lance with a hook in order to pull the adversary out of the saddle; a scimitar or a battle-axe; and, not least, a lasso, the Mongols being past-masters in the use of this weapon.

The second passage dealing with the crossing of mountains is this:

...so now, in mid-winter, began an audacious ride into the unknown beside which Napoleon's and Hannibal's crossings of the Alps pale. The army of from 25,000 to 30,000 men entered a cleft... in the mountains, riding through snow five or six feet deep, at a temperature which threatened to freeze the horses' legs, to reach the ice-bound passes... at a height of over 13,000 feet. Amid raging snow-storms they struggled along in a frozen world between mountain giants considerably over 20,000 feet high, the legs of their horses being wrapped in yak-hides, while the men were muffed up in... double sheepskin coats. To warm themselves, they opened the veins of their horses, drank the hot blood, and then closed the wounds. All superfluous baggage, everything with which they could dispense, was thrown away to make the advance possible for men and beasts, and yet the route was littered with the skeletons of horses. Only the skeletons, for the riders devoured the flesh to the last morsel while it was still warm.

So, you see, in the days of Jenghis Khan no gasoline was required, for the ragged ponies of the Mongols found their own food in the grasses and roots beneath the snow, and when worst came to worst, their flesh furnished food for the men to eat and their hides made clothing for them to wear and tents to shelter them.

That is the way men made war seven centuries and a quarter ago. These were not isolated gangs of marauders, but organized armies numbering sometimes as many as a quarter of a million men or more. The main reason why Jenghis Khan's services of supply were simple was not because his armies lived off the lands they conquered, or because his soldiers were tougher than are the soldiers of today. It seems to me that the main reason was quite otherwise. The Mongols traveled light, and they traveled light because the art of war had not yet devised the vast and complicated trappings of the twentieth century.

You got more than an inkling of what these trappings amount to at the session this morning, when four distinguished speakers discussed the war of distances. They spoke of transport by rail, by sea and by air. What they did in substance was to show how the transport facilities of the twentieth century are dealing with the problems of bulk and variety which the science of the twentieth century imposes on the conduct of war.

This afternoon we are to carry the discussion further. The topic set for us is "The Armed Forces—Their Movement and Supply".

Our first speaker will discuss the system of military transport in Germany. He was introduced to me in Germany some fifteen years ago. I have had reason many times since to be grateful for that introduction, because our friendship has lasted through the intervening years. He was reluctant to talk this afternoon, for he is no more in the confidence of Mr. Hitler or Mr. Goebbels than any other American. But Dr. Stolper has in his training singular qualifications to appraise what the situation in Germany is in the matter of the services of supply, for in the last war he was the head of the Research Section of the Commissariat of War Economy in the old Austrian Empire. He is an Austrian by birth.

After that war, he moved to Berlin where he became ultimately a member of the German Reichstag and a member of its committee dealing with the railways. He was the editor of the leading financial publication in Germany, *Der deutsche Volks-wirt*. He came to the United States some seven or eight years ago and in the meantime has become, I am happy to say, an American citizen.

He has published recently two books, each dealing with important aspects of economics. The first was called *German Economy, 1870-1940*. The second book, published recently, was *This Age of Fable*.

I now have great pleasure in introducing to you Dr. Gustav Stolper.

GERMAN MILITARY TRANSPORT

GUSTAV STOLPER

WHEN Mr. Lewis Douglas asked me to speak to this meeting on German War Transportation, I accepted with the very important reservation, that he would not expect me to establish myself as a one-man private intelligence service. If I could do that, the results of my work would have been submitted to the American Army and I would not be free to speak. Our knowledge of facts about an enemy at war is limited, and our conclusions are therefore largely hypothetical. That implies my second reservation. Our judgment during a war is necessarily weighted heavily by emotional bias. In the case of Hitler's Germany our emotions are stronger than with respect to any other enemy, past or present. These emotions may color our judgment in two opposite directions, according to our temper. There are the ones who have told us every week since the beginning of the war in 1939 that Hitler was on the verge of collapse, that the whole German military machine was flimsy and fake, that the German people were about to succumb to the blockade and would rise very soon against the régime, organized by a vast underground movement. There are others, rapidly increasing in number, who have told us persistently that Hitler was invincible and unbeatable, that the German Army had an air force which would swamp all its enemies, that the German people were better fed than all its European enemies, certainly better than the British, that the government had accumulated inexhaustible stores of all raw materials needed and that German ingenuity would in a short time organize the resources of Europe on a scale that would make Germany an unconquerable fortress.

Both these extremes are, of course, plain nonsense. But it is difficult indeed to find the exact position of the truth.

As one who knows something about what happened in the last war and about the weakness and strength of Nazi Germany, I am inclined to think that we have underrated the German strength in the first three years of the war and that we are greatly overrating it now. We all know that the weakest point

determines the resistance on the whole front, and I regard transportation as the weakest link in the German armor. Again we should beware of exaggerations. In one of those deservedly popular war books of American correspondents, *The Last Train from Berlin* by Howard K. Smith, I read the other day:

Here are absolutely reliable figures from a trustworthy Nazi source on the situation in the locomotive industry. At the beginning of the Russian War, Germany possessed a total of 11,000 locomotives (the figure does not include between 5,000 and 6,000 switch-engines). Around 4,000 of these were taken from Germany and sent to Poland and Russia for the Russian campaign. As they were destroyed or had to be returned to termini for repairs, the remaining stock of 7,000 had to be largely drawn away from the home front to replace them. My source declared that by the time the winter (1941) set in on the Eastern front, a total of 4,000 locomotives—equal to the original total used in the East—had been destroyed beyond hope of repair by the sabotage of partisans and by bombing and artillery fire at the front. If all these have been replaced by drawing from Germany itself, it means that only 3,000 of an original 11,000 locomotives are available for transport of all kinds inside Germany.

If the author of that book had only stopped to look for a moment at the German Statistical Year Book or the Report of the German Reichsbahn, he would have quickly discovered how trustworthy and absolutely reliable his source was. Not one of those figures has any bearing on reality. The number of German locomotives at the beginning of the Russian campaign was probably over 30,000, and in German-dominated Europe over 60,000, rather than 11,000, and a very brief consideration might have told the writer that if Germany really had only 3,000 locomotives left, Germany would have collapsed within one week through hunger because 3,000 locomotives could not move even the minimum requirements of food for a substantial portion of the German population.

The picture is not nearly as simple and happy as our enthusiastic reporter believes.

II

The conditions of the German transport system with which Hitler entered the war are rather well known, because the German statistics were unusually detailed and comprehensive. As in this country, German railroad traffic fell off very sharply after

1929. By 1933 it had dropped by almost 40 per cent from that level. By 1937 the volume of traffic of 1929 was regained. "The capacity limit of the Reichsbahn was reached in 1937", remarked the very informative report of the government-owned *Reichskreditgesellschaft* early in 1938. The shortage was officially estimated at 100,000 cars in the autumn of 1937. Yet the industry could not deliver even the small number of locomotives and cars on order because of lack of steel. However, 1938 brought a huge additional demand on the railroads. The invasion of Austria in March 1938, followed by the rapid construction of the West Wall and by the occupation of Sudetenland in the autumn of 1938, taxed the railways to an enormous degree. The test was not a complete success. Yet the weaknesses that became apparent in 1938 and 1939 were far from crucial. Germany, already before the outbreak of the war, had to restrict passenger traffic, and, for a time in 1938 and early in 1939, even on the more important lines no printed timetables were published. Nevertheless, the weakness of the railroad system was alarming enough to induce the German authorities to announce in March 1939 a four-year plan comprising the procurement of 6,000 locomotives, 10,000 passenger cars, 112,000 freight cars and 17,000 motor trucks at a total cost of RM 3,500 million. These figures sound bigger than they are. By the end of 1938 the Reichsbahn had almost 4,000 locomotives and 80,000 freight cars fewer than in 1929. The official figures for 1938 do not show quite as large a reduction, because they include in the figures of the Reich the booty of Sudetenland. The incorporation of the Austrian system into the Reichsbahn, carried out in 1939, was rather a contribution of weakness than of strength. The Australian railroads in all preceding years had suffered under a terrific deficit, and as the fiscal policy of the Austrian government was rather conservative, they had cut down for many years not only on additional purchases, but even on the maintenance of roadbed and rolling stock. Moreover, no less than 75 per cent of the Austrian railroads were single-track (against 58 per cent in the Old Reich), and running chiefly through mountainous country with steep curves and numerous tunnels and bridges.

In other words, the four-year plan of 1939, if carried out in its entirety, would have restored only approximately the

1929 conditions. But it was not carried out until 1941. By 1941 the locomotive output had been increased ten times over 1938 and doubled that of 1940. The other day the British Ministry of Economic Warfare reported that Germany was embarking on a program to build 6,000 to 7,000 locomotives annually. That sounds fantastic enough in view of the fact that the American railroads, even in 1941, did not acquire more than 620 locomotives! Yet, while we may apply a pretty large discount to that figure, we cannot rule it out as an impossible achievement, with Germany in control of the combined capacity of the locomotive industry of Continental Europe.

Although the number of locomotives declined steadily until the outbreak of the war, the Reichsbahn did a pretty good job in repair and modernization. Thus the number of steam locomotives under repair could be reduced from 4,373 in 1929 to 2,475 in 1938, thereby largely offsetting the decline in engines available. In addition, the number of electrical locomotives increased from 388 to 571. This increase may seem puny, but we have to remember that these electrical locomotives were all modern and very powerful engines, equaling in motive power a far greater number of steam locomotives. Furthermore, a considerable number of switching tractors were put into service in these years, replacing steam locomotives in switching service. Finally, we must remember that even in 1929 a substantial number of locomotives were kept in reserve, while in 1938 the entire equipment was put into service.

With all this, the German railroads barely kept pace with the growing transportation requirements. On the assumption of a thirty-year life of a locomotive, the Reichsbahn should have acquired about 700 locomotives annually. The actual average of locomotives delivered during the thirties was between 100 and 200. However, the average age of the German locomotives at the outbreak of the war was below twenty years, while we know that over 70 per cent of American locomotives are over twenty years, the average over twenty-five years.

The picture of the car situation and the conditions of the roadbed were equally complex. As mentioned before, the number of freight cars fell off considerably between 1929 and 1938. Nevertheless, the mileage performed by that smaller number was about 15 per cent greater than in 1929. The

probable explanation is again that even in 1929 there was still a surplus of unused cars available. But above all, the equipment of all German railroad cars with automatic air brakes made an acceleration of freight movement possible. The obsolescence of the freight cars grew faster than that of the locomotives. On the basis of a forty-year life of a freight car, the Reichsbahn should have acquired an average of 15,000 cars a year, but actually purchases up to 1938 were not much more than one-tenth that number.

The neglect of the roadbed was even worse. The mileage of tracks renewed shrank continuously even in the thirties. Assuming again a twenty-year life for rails, about 3,000 kilometers a year would have been the standard requirement of maintenance. Actually, in 1929, 3,400 km. were renewed. But that performance fell off from year to year until in 1938 it reached only 1,026 km. While it may be true that the rails laid in the thirties were heavier and of higher quality, the introduction of high-speed trains and the use of new types of heavy locomotives contributed probably at least in an equal degree to the deterioration of the roadbed.

This picture of the pre-war German railroad system is certainly in sharp contrast with the picture presented to us by the enormous strides made by German industry in other respects. We have heard of the German conquest of the air, we have read about or seen the construction of thousands of miles of most modern automobile roads, Hitler's much vaunted *Autobahnen* (1,800 miles completed by the end of 1938), and the *Volks-wagen*, the popular priced automobile for which, a queer reversal of the American system, people had to pay their installments in advance and in the end did not get the cars. But the railroads were Hitler's stepchild. He looked down on them, as do some people in this country, rather disdainfully as a means of transportation belonging to the past rather than to the future. He had to pay dearly for this error in judgment.

III

From the autumn of 1939 on, Hitler's transportation problem changed from a German into a European one. In this transition we have to distinguish three phases. The first, that of the blitzkrieg in Poland and the "phoney war" in the west,

lasted from September 1939 to May 1940. The second we may call the phase of the conquest of the European Continent short of Russia. It is marked by the occupation of Denmark and Norway and the conquest of France, Belgium and Holland in the spring of 1940 and the Balkan campaign in the spring of 1941. The third, the most crucial phase for the German transportation problem, started with the attack on Russia in June 1941.

The first phase was relatively easy, although it added a two-fold strain on the German transportation system. One was the occupation of about half of Poland, which extended the supply line of the German army without much additional equipment. The Polish locomotives and cars, never too numerous and in too good a shape, were largely destroyed, or disappeared to Russia. Many bridges and tracks were broken up. This was badly felt in a country with poor roads which had to rely on its railways much more exclusively than Germany. The second strain, much more severe, was imposed by the British blockade. The blockade meant a serious dislocation of traffic, with the result that practically all the German sea-borne traffic within European waters had to be taken over by the railroads. The transportation of German coal to Italy, and of Italian fruit and vegetables to Germany, as well as most of the trade with the Balkans prior to 1939, was by sea. Roumanian oil was pipe-lined or carried by rail from the Ploesti district to Constanza and shipped on German tankers to Rotterdam or Hamburg; or Roumanian wheat was carried from Braila and Galatz. Germany never had enough tank cars to replace those tanker ships. We must realize that one tanker of a typical average size of 6,000 tons is the equivalent of about twelve trains on a haul of about 1,500 railroad miles without a return load. When Italy joined the war, Germany committed herself to deliver one million tons of coal every month. This had to replace both former German sea shipments and English coal on which Italy was heavily dependent. Now, one million tons of coal a month meant about 40,000 tons a weekday, or an average of at least sixty trains, because trains of more than 600 to 700 tons cannot be carried over the Alpine passes which connect and separate Germany and Italy. It has been estimated that at least 30,000 freight cars are permanently tied up in that German-Italian coal traffic.

Of course, the demand for transportation rose, within Germany from 1940 on, proportionately with the intensification of war production. However much civilian consumption was curtailed, the total tonnage to be carried jumped in 1940 and 1941 far above 1938. According to official German statements, taking 1938 as 100, kilometers covered by freight trains rose to 115 in 1940 and 132 in 1941, kilometers by freight cars to 122 and 144 respectively, but tons of goods carried rose even to 163 and 176 respectively. As we know that the load carried in 1938 was about 400 to 500 million metric tons, it must have risen, by 1942, close to 1,000 million tons, which is by comparison about two-fifths of the American performance, an enormous feat.

IV

How did the Germans manage it? They drew on three principal reserves.

The first was a severe curtailment of passenger traffic. Before the war, of the total Reichsbahn traffic in train kilometers about two thirds were performed in passenger and one third in freight traffic. It is obvious how much equipment, particularly in motive power, could be set free by radical restriction of civilian passenger traffic, and certainly a sufficient number of cars could be made available for the heaviest troop transportation.

The second important reserve to be tapped was the booty in the conquered countries. It is difficult to gain reliable estimates on that score. But we must not overrate its importance. There was—as mentioned before—no booty of railroad material in Poland, and very little equipment could be gained from Denmark and Norway, since both countries together had barely 1,000 locomotives and about 20,000 serviceable freight cars, which was hardly above the minimum required for their own (and the German) purposes. There was not much surplus equipment gained in Holland, which was never richly supplied with rolling stock, because the country was largely dependent on its canal system for freight traffic. Moreover, a large part of the Dutch railroad system is of small gauge which made its equipment unusable for the Germans. The two countries where the loot was sizeable were France and Belgium. Both countries had built up a substantial rolling stock, largely with

the help of German reparations in the twenties. It is remarkable that Belgium, for instance, a country of about the same size and population as the Netherlands, had three and a half times the number of locomotives and almost four times the number of freight cars of Holland. Undoubtedly a substantial part of the 3,500 Belgian locomotives and 100,000 Belgian freight cars have been diverted to the German war machine. France, of course, was much more important. The number of French locomotives, 19,000, was almost equal to the German, and the number of French freight cars, nearly 500,000, was also approximately equal to the German. How much of this equipment was left to Vichy is unknown. But we may be certain that the Germans were not squeamish in their demands, and the number of French locomotives and cars carried to the east must have been very considerable. It was possibly the most precious part of the German loot and one of the vital contributions of France to the Russian campaign.

The third source which the German war transportation exploited to the limit was the inland waterways. We must remember that these waterways always played a comparatively large rôle in the German transportation system. The total tonnage carried on them amounted to nearly 150 millions by 1938, about one third of the load carried by rail. The Rhine, the Elbe, the Oder and the Danube were always vital traffic arteries, and the efficiency of that river system was greatly enhanced by the completion in the autumn of 1938 of the Midland Canal, connecting the Oder with the Elbe and the Rhine; in other words, central Germany, and particularly Berlin, was connected with both the east, gravitating toward the Baltic, and with the west, gravitating toward the North Sea. Most of the heavy stuff, particularly coal, ores, stones and other building material, and oil were thus assigned to waterways, relieving the railways. Recently even a part of the passenger and parcel traffic, particularly along the Rhine, was forced to use the river boats rather than railroads. There are, of course, two handicaps connected with that waterway traffic. It is practicable for eight to nine months only, because the rivers and the canals are frozen in winter, and barges and port facilities are limited. Complaints about shortage of barge space were loud in 1938. But we may assume that many barges were seized in Holland

and Belgium and an even greater number built during the war. The capacity of port loading and unloading facilities was more difficult to increase, particularly on the lower Danube whose navigating capacity is always restricted by the Narrows of the Iron Gate. But no doubt the Danube traffic is at present at an all-time high.

V

With all this, Germany somehow squeezed through until the Russian campaign—the third and last phase. This campaign changed the picture radically in many aspects. First of all, it increased enormously the length of the supply line of the German army. Early in 1942 the Reichsbahn management boastfully reported that the Russian campaign required about 10 per cent of its rolling stock—that would be about 3,000 locomotives. Hitler himself reported to the Reichstag a short time ago that Germany took over Russian railways to the extent of 25,000 kilometers. As most of this system was one-track, it was almost tantamount to doubling the pre-1938 German system. Hitler made this even more impressive to his audience by explaining to them that it was the equivalent of fifteen times the distance from the Baltic to the Bavarian Alps. This railroad system had to be taken over and put into operation at a maximum speed, with most of the bridges, switches, and the signal system destroyed and no rolling stock because the Russians had practically driven away or completely destroyed all locomotives and cars. But before even German equipment could be used on the Russian railways, the tracks had to be changed because the Russian railroads had a wider gauge than Central Europe. As the number of the German locomotives and cars with adjustable gauge was negligible, one rail had to be moved all along these 25,000 kilometers, a terrific job considering the urgency of the task. Anyway, equipment, which was barely enough for emergency requirements before, now had to be used for an additional territory of that enormous size with tremendously extended average haul and with road-beds whose condition permitted only slow movement. How much German equipment, locomotives and cars, was destroyed in the Russian campaign is not known. The figures mentioned by some reporters are fanciful. But there can be no doubt that

the Russian winter with the German shortage of lubricants and fuel oil must have wrought very serious havoc to the German rolling stock. The certainly unsuspect *Deutsche Allgemeine Zeitung* admitted in April of this year that "the winter of 1941/42 in the East was absolutely fatal for railway material". In addition to the requirements for permanent supply with food, clothing and arms of an army of several million men, many thousand cars were continuously required as habitations for the troops, for whom in the long winter these railroad cars were the only shelter; railroad trains also had to be used as hospitals and disinfecting stations. Finally, numerous trains were moved all the time as repair centers for broken-down equipment, because no permanent repair bases were available in Russia. I for one have no doubt that shortage of transportation facilities was the principal reason that Hitler had to delay his 1942 offensive in Russia till the end of June, and thereafter had to concentrate all his efforts on one front, and even there was not able to mass a sufficiently strong force to overcome the resistance of an exceedingly valiant, but also deeply exhausted, enemy.

The other day, Major George Fielding Eliot calculated convincingly that the one active fighting sector around Stalingrad and the Caucasus requires, on the part of the Germans, transportation of not less than 100,000 tons daily for rations, forage, ammunition, engineer supply, spare parts—and this does not include replacements of men and animals and gasoline and oil. This is the equivalent of at least 125 trains which must arrive every day at the sparse railheads of the army, from where equipment must be hauled to the front in trucks. May I quote Major Eliot:

If we assume, and it is a conservative assumption, that the average truck haul is 300 miles (it is much less in some cases and much more in others) we must consider this figure in the light of the fact that on the sort of roads he [von Bock] has available, the average day's march for truck columns is not more than 150 to 175 miles. To move 100,000 tons of supplies takes 66,000 trucks of the one and one half ton-type standard in the U. S. service, and the Germans are hardly using anything bigger on the wretched dirt tracks of Southeastern Russia.

Therefore, somewhere in von Bock's communication zone, day in and day out, not less than five echelons of 66,000 trucks each are operating—two on the way out, two on the way back and one loading or unloading.

These are average figures, of course, it is not all as simple as that, but they will serve to give an approximate measure of the size of the German supply organization. The total is 330,000 trucks, and to keep 330,000 trucks moving an organization of about 1,000,000 officers and men, more rather than less, is needed. This is just for the trucks alone, it does not include men for loading and unloading, guards and dumps and depots, administrative personnel, and so forth, nor does it include railway operation.

This explains, indeed, what is happening to the German armies in southern Russia.

But there is another factor which makes itself increasingly felt: the effects of the British bombings on western Germany. To assess these effects we have to realize how particularly vulnerable the German transportation system is on account of the concentration of German industry and traffic in the German west. No less than 40 per cent of the total German traffic originates in the Rhine-Ruhr District. From there the major part of Germany receives its coal, steel, machinery and tools. Any disturbance in that enormously complicated transportation system immediately affects the greater part of German industry, even in those regions of the country which are rarely visited by British bombers. That is why the Royal Air Force concentrated so heavily on places like Osnabrueck and Hamm, nerve centers of extreme sensitivity. No doubt, they do not function any more with anything like their former capacity.

For the immediate future a third factor must be considered: the German railroad organization since the fall of France has been geared to the flow of material and men to the east. It is hard to imagine how Germany can prevent a breakdown of that overstrained system when an attack in the west and south forces her to reverse the direction of that entire traffic. The reserves that enabled Germany in 1941 to start its abortive campaign in Russia, and that obviously strangled the German strength in the second offensive against Russia in 1942, do not exist any longer. In this, as in so many other respects, Hitler has reached the end of his rope.

VI

You do not expect from me, a civilian layman, a military prediction in a discussion in which the responsible leaders of the American armed forces participate. But you all remember

that not very long ago many Americans praised the glory of dictatorships because in the dictatorial countries the trains run on time. I was never able to understand how trains running on time could justify concentration camps and the utmost degradation of the human race, and from my intimate knowledge of Europe, and particularly of Germany and Italy, I can only say that German trains ran perfectly on time under the Republic, and that I have never traveled on an Italian train arriving on time under Mussolini. However that may be, the transportation problem whose solution formed a part of the glory of some dictators in the eyes of some naïve visitors and onlookers is now falling back on these dictators with a terrific vengeance. When the history of the defeat of the totalitarian criminals can be written, and I am sure that this defeat is not far away, then transportation shortages will properly be described as the first and paramount weakness which led to their destruction.

REMARKS

CHAIRMAN MORGAN: Thank you, Dr. Stolper.

They say that a good military commander is one who foresees the future and gets ready for it. I think we can say that Colonel Karl Detzer qualifies as a good military commander, because yesterday when he left Washington he saw that the war had taken another and a very impressive turn. So, while General Somervell was still confident that he could come this afternoon to talk to The Academy of Political Science, Colonel Detzer tucked in his pocket the speech which General Somervell was going to deliver at this session. It is a pleasure to introduce anyone with that degree of prescience. We shall have great satisfaction in hearing General Somervell's words from so competent a source.

LIEUTENANT COLONEL KARL DETZER: Mr. Chairman, ladies and gentlemen, at noon today General Somervell phoned me in New York and said, "Do you have copies of my speech?"

I said, "Yes, I have copies to give to the press."

He said, "Those aren't the only copies you have. You have one to read to that audience. I haven't been able to get off the ground in my plane. I wish you would tell those people up there how very, very disappointed I am at not being able to get there, and I wish you would convince them that I have tried but that the wind is really blowing down here."

This is the talk that General Somervell planned to give you. His subject is logistics.

[Lieutenant Colonel Karl Detzer then presented the address of Lieutenant General Brehon B. Somervell.—Ed.]

UNITED STATES ARMY SERVICES OF SUPPLY

LIEUTENANT GENERAL BREHON B. SOMERVELL

Commanding General of the Services of Supply

THE science of war breaks down into three simple divisions—strategy, tactics and logistics. Today I shall discuss one of these three. I shall attempt to show the part logistics has played and will play in the present war.

But first, let us get our nomenclature straight.

Strategy is the long-term science or art of war, planning of whole campaigns, envisioning the over-all situation, deciding how armies and navies will or will not be employed—that is strategy.

Tactics is the science of handling units in the field of action. It is the close-up military science; it concerns the placing and utilization of troops, airplanes or naval vessels, as the case may be, the movements in the arena of combat, the grouping of specific task forces.

Any tyro in the military art knows these two. But what about the third great division? What is the science of logistics and how does it fit into the pattern of successful combat? Where do strategy and logistics meet, where overlap?

Stated briefly, logistics is the science of transportation and supply in war. It is the art of getting the right number of the right men to the right place with the right equipment at the right time.

When we hear "too little and too late" we know that someone's logistics plan has broken down. When we hear "our troops are advancing" we know not only that strategy and tactics are succeeding but that logistics is doing its part. In Africa we are witnessing the result of a logistics breakdown. Allied planes, blasting Rommel's supply line from Europe, prevented munitions and fuel from reaching the Axis armies. The headlines are shouting the results.

Good logistics alone cannot win a war. Bad logistics alone can lose.

The history of logistics is not quite as old as the history of war. Battles between early barbarian tribes were fought on the spur of the moment. Men met and fought and ran away.

The name of the first tribal chieftain to employ even a crude supply plan is hidden in the mists of antiquity. Tactics and strategy were born on that night many thousands of years ago, when some chieftain sat at the campfire with his followers and planned the next day's battle and gave some thought to the day after that. Logistics was born the day some barbarian leader ordered his tribe to bring up food and forage and extra weapons for tomorrow's fight.

History has little to say of the masters of logistics. The man on horseback, not the leader of the pack train, stirs the imagination. Logistics is troublesome work. It is all labor and no glory. It involves more sweat than blood.

There are ten military students who can tell you how Blenheim was won for every student who knows what administrative preparations made the march on Blenheim possible. It is certain, though, that no leader has been successful without careful handling of his logistics.

Primitive warriors, no doubt inspired by chivalry, left much of the work to their women. In the valleys of the Nile and the Euphrates 8,000 years ago women followed the troops and did the chores. They carried burdens, grew small patches of grain, gathered fuel, scraped and tanned skins, stored the food, fashioned spears, kept camp fires alight.

We find today's parallel in our munitions factories where forty per cent of the workers in many industries are women. Tomorrow the number will be greater. Before we win, I venture to predict, half of the work behind the lines will be women's work.

In spite of its importance, logistics has remained a stepchild of the military art. There is no glory in it. Thousands of volumes have been written on tactics and strategy—many of them, I admit, compiled by soda-fountain strategists—but I find that few writers have ever taken the trouble to put studies of logistics between cloth covers. Not that this science was completely ignored, even by the ancients. It was Socrates who, describing the art of generalship, wrote: "The general must know how to get his men and their rations and every other kind of stores needed for war. He must have imagination to originate plans, practical sense and energy to carry them

through. He must be observant, untiring, shrewd; kindly and cruel; lavish and miserly; generous and stingy; rash and conservative. He should also, as a matter of course, know his tactics."

You will see that wise old Socrates placed logistics first and added tactics almost as an afterthought. Notice, too, what he says of the commander's dual personality, his kindness and cruelty, his quality of lavishness and miserliness, the necessity of being both a robber and a watchman.

This is as true today as it was several thousand years ago. Our critics, when they charge us with robbing some nonessential civilian industry of raw materials in order to make sure that the soldiers have enough, are paying us a compliment. When they say that we are miserly with the civil needs of the nation and lavish with military needs, they are merely stating that we know the military art—the art that wins battles in the end.

One of the greatest masters of this art was Moses. When he led his people out of captivity he succeeded because he employed logistics on a grand scale. Feeding his people in the wilderness was a triumph in the commissary department, clothing them was a job for quartermasters, hauling their camp gear fell to his transportation division, his signal corps kept up communications—and I wish our engineers today could employ whatever scheme he used to cross the Red Sea!

His father-in-law, Jethro, counseled Moses wisely when he said: "Thou wilt surely wear away . . . this thing is too heavy for thee. Thou art not able to perform it alone." Moses heeded him. He named able lieutenants, gave them authority and ordered them to use initiative and decision. He made over-all plans and his subordinates carried them out. Moses was a great general.

Cyrus and Alexander are remembered for the Macedonian phalanx. But it was not the phalanx that made them great. This tactical formation originated with neither of them. They merely added more men and weapons to an old idea. What they did originate was a system of transport and supply. They won their battles.

Caesar's conquest of Gaul was a logistics triumph. He built up the Roman fleet; he reconstructed the ports; his engineers laid out the longest lasting military highway system in history;

he provided fresh water for troop concentration points; built up a plan of communications. Caesar was a master of logistics.

Compare these successful logisticians with the greatest military success and failure of modern history, Napoleon Bonaparte. The Moscow fiasco was not the fault of tactics or strategy. Napoleon failed because he did not organize an adequate service of supply. He failed to delegate authority. He chose to be his own tactician, his own strategist and his own quartermaster. He was writing letters about the badly made saddles, the price of shirts and the quality of bread at a time when he should have been devoting all his energy to problems of the high command.

As Napoleon's forces moved toward Moscow, the advance guard had the rich granaries of Poland and Russia to draw upon. There were magnificent herds of cattle in Galicia. Many pack horses and vehicles were available. But Napoleon's commissary troops dissipated these priceless supplies. There was no decentralized authority, no plan. More food was trodden under foot than eaten. "A little order", the Crown Prince of Bavaria wrote home during the campaign, "would have saved the day"—a little order and a coördinated plan for shelter and for getting and distributing supplies.

Napoleon's shortcomings did not fall on barren ground in Germany. In 1868, before the outbreak of the Franco-Prussian War, Von Moltke drew up a comprehensive plan. Under it, Bismarck handled strategy and political background, Von Moltke organized and trained the army. Von Roon was responsible for mobilization and supplies.

Germany carried out that plan. Just forty-five days after the declaration of war, Napoleon III surrendered at Sedan.

In our own Civil War both sides neglected to make comprehensive plans for supply and transportation. In the later years of that war, we find General Sherman appealing to Washington for a chief quartermaster. "Draw me a program," he wrote to General Allen, "whereby orders may issue from the War Department enabling you to act as my chief with power to . . . direct the course and accumulation of supplies, the distribution of . . . transportation, and all details purely pertaining to your department. I must have some quartermaster whose sphere is coördinate with my own."

Stanton refused Sherman's request, and in another letter, directed to Meigs in May 1864, Sherman wrote: "I think Secretary Stanton has made a mistake. . . . By providing means of transportation at the very time and in the manner demanded by events which cannot always be foreseen, a quartermaster can assist in achieving success."

Sherman did well without the top-side logistics officer, but it must be remembered that his Army totaled only 100,000 and he himself had to perform duties which should have been left to a subordinate.

In World War I the United States made much progress in logistics as a necessary science in warfare. The scale of operations, the distance from our home bases, and our allies taught us much.

These lessons were not forgotten and were embodied in the course of instruction in our Service Schools. Practice, however, was sadly lacking, owing to the size of the Army and the restricted, not to say miniature, scale on which maneuvers were conducted. The amount of the appropriations available, which was the basic cause of this condition, also forced an organization on the War Department which was not in step with large-scale streamlined operations.

Just three years ago, the United States again turned its attention toward the state of its armed forces. It answered some of the pleas of the War Department. Important steps were taken to provide the Army with modern military equipment. It is unfortunate they could not have been on a grander scale.

On this point let me quote General Wavell to the effect that the soldier is apt to disregard or underrate the statesman's difficulties. Wavell says: "The politician has to persuade and confute; he must keep an open and flexible mind, accustomed to criticism and argument; the mind of the soldier, who commands and obeys without question, is apt to be fixed, drilled and attached to definite rules."

This, together with our traditional military policy, probably explains in part at least why our statesmen and our soldiers were so slow to see eye to eye, early enough to prepare adequately.

But as the European battles increased, as one nation after another fell, it became more evident that Germany had reached a new peak in the science of logistics. No army could advance and consolidate so much territory in so short a time without split-second, timetable supply and transport. Our concern increased with each Nazi success. Service and civilian boards and committees wrestled with production problems. We found ourselves the arsenal of democracy. We were on our way to an all-out program.

On December 7, 1941, almost overnight, we became a full-fledged combatant. It was then possible to call upon our entire productive resources, our men, our materials, our machines, to provide the implements and their transportation for the struggle.

In January 1942, the President created the War Production Board which immediately absorbed the Office of Production Management and the Supply, Priorities and Allocation Board. He conferred upon the chairman broad powers to direct the nation's production and procurement effort.

In March, the Army was redivided into three branches, Ground Forces, Air Forces and the Services of Supply. Grand strategy remained the function of the high command; Ground Forces and Air Forces, the fighting arms, took over training. Logistics rested with the Services of Supply and the field forces.

The three are of equal importance. Should any one of them collapse, the other two automatically will fail.

Immediately after reorganizing the Army, the War Department made an agreement with the chairman of W. P. B. defining the respective fields of the two agencies. Under this arrangement, the War Department was charged with determining its military requirements, including new plant facilities, transportation and communications, and translating them into terms of demands for raw materials, tools and labor. It was further charged with the negotiation, placement and administration of contracts for procurement of its supplies. Its duty was to determine specifications, plans and research with an eye on conservation of critical materials.

The framework was ready. It was almost entirely the job of S. O. S.—the Services of Supply—to complete the building. That we started to do. That we still are doing.

Just what is S. O. S.? It handles logistics and administration. Its purpose was to take these loads as far as possible off the mind of the Chief of Staff. It is the biggest business in history, the most widespread, geographically. It employs more people, owns more land, spends more money, handles more merchandise than any other organization the world has ever known. Still you do not begin to get the picture. For in addition to these functions, there are attached to S. O. S. all the administrative duties not actually a part of Ground Forces or Air Forces.

From the moment an American soldier holds up his hand to be sworn in until he is discharged at the end of the war, S. O. S. takes care of him. It feeds him, clothes him, houses him, transports him, schools him in many or all of his duties. It looks after his morals and his manners. It tries to keep him happy in 2,000 army motion picture theatres where he sees films fresh from Hollywood at an admission price of twelve and a half cents—and thus it becomes the greatest showman in the world. It feeds some fifteen million meals a day, bakes more bread than any other hundred bakeries in the world, launders more clothes than all the other laundries, mends more shoes than all the other cobblers, patches more tires than all the other repair shops, provides more beds than all the hotels.

The 60,000 military police keep order among soldiers in troop concentration points—and they are part of the S. O. S. Army courts that try the soldier when he misbehaves are under the direction of a section of the S. O. S. The Chaplains who minister to the soldiers' spiritual needs are part of the S. O. S. The army exchanges, the camp and post stores that sell cigarettes, chewing gum, toothbrushes, candy bars and beer—a billion dollars' worth this year, by the way—are part of S. O. S.

The Services of Supply builds the Army's roads and camps and hospitals. In the past two years the S. O. S. has undertaken nine billion dollars' worth of purely military construction, and already has completed three fourths of what it undertook. If all the concrete runways we have built on army airfields were spread out side by side they would pave our smallest state of Rhode Island from border to border. If all the army land we have bought for camps and fields and target ranges and other installations were lumped, it would cover more than half of England. That is a lot of real estate.

The S. O. S. operates the army telephone and telegraph lines and the biggest radio network in the world. It nurses the sick soldier and binds the wounds of the soldier who is hurt. It keeps the Army's accounts, pays the soldiers and civilian employees, carries part of its mail, clothes every individual soldier, designs his weapons, oversees their manufacture, takes them to him where he needs to use them.

That's the job of the S. O. S.

But there is even more.

We have not overlooked the fact that education must play a tremendous part. We must have research and training. Today's research program in the Army totals in dollar expenditures a figure approaching if not surpassing the entire procurement of peacetime years. Facilities of American universities have been offered and accepted. Our critical materials are limited. We must have substitutes. We must use steel in place of brass, plastics in place of steel. This is a war of specialists and technicians. Constantly, the Army must increase its fund of technical information. We must train, and we are training. We have reached the pedagogical pinnacle as the nation's greatest training and educational institution.

It is not a one-man task. It is divided into some thirty divisions, arms and services. Each of these is headed by an expert, a man trained through the years for his particular job. Many of these officers are from civil life, picked out of key positions in industries. Others, particularly in the administrative services, have had long army experience.

Under these key men the various branches of S. O. S. again are subdivided, and each subdivision is headed by a man who knows what he is doing. Authority is spread thus down the line. Only on matters of broad policy is it necessary for any department head to ask advice of his superior. We have good men, and are getting more, the best in the world, in all positions of trust, and we trust them. They are doing a magnificent job.

They are doing that job under immense difficulties. Urgency prods them every minute, day and night. We started many years after Germany and Japan. We must make up for lost time.

Pure logistics would indicate that the machinery for producing all these services should be set up in peacetime so that when

war comes we could turn a switch, step up the current and meet the demands. Industry should be geared not alone to production of peacetime goods but to the maximum demands of wartime. The tools and machines must be ready for the next conflict.

Yes, we did have a great industrial machine but it took time and patience, men and dollars, before the thin trickle of needed war production became the great stream that is now pouring out in ever increasing proportions. Even today it is not yet the surging torrent that we must have if our logistics are not to burden too greatly the tactics and strategy of the United Nations in all corners of the world.

Between five and twelve tons of equipment must be landed with every soldier sent overseas. Another ten must be shipped to him each month in food, clothing and ammunition. Men and machines and ships must dig out the raw materials, process them in the factories, carry them to the seaboard and finally ship them through the narrow, dangerous waters that are the oceans of the modern world.

No matter how difficult the task, S. O. S. must come through. There are nights when tens of thousands of soldiers must be shifted great distances across the continent. On these same nights heavy freight trains, laden with raw materials, must rush toward industrial plants while others, loaded with finished tanks and guns and planes, must hurry to ports of embarkation. All the while the machinery of training of new troops must continue without slowdown or interruption just as the fighting continues on the front lines. Supplies must reach the battle regularly and generously.

There can be no blackout, no letup for an instant in the great factory we call Services of Supply. It is a twenty-four-hour job, seven days a week.

Yes, logistics is a science. But we who practice it have another name for it. It is the biggest headache in the world. But praise the Lord, we are going to pass the ammunition and have it there to pass.

REMARKS BY THE CHAIRMAN

CHAIRMAN MORGAN: I think the eloquent author of that speech could not have delivered it better himself.

We now come to a problem of logistics which concerns not only the Army and the Navy and the Air Force, but ourselves, that is to say, the supply and delivery of rubber. Fortunately we have somebody here who knows all about it, Mr. John Lyon Collyer, the President of the Goodrich Company, who is going to make a little demonstration in the course of his talk.

CRISIS IN RUBBER

JOHN L. COLLYER

President, The B. F. Goodrich Company

IT is a pleasure for me to meet with members of the Academy of Political Science. I feel honored and privileged to acquaint you with certain facts pertaining to the all-important question of rubber—natural and man-made.

America is in the grip of a rubber crisis. This is a fact. Our country, which normally uses more than half of all the rubber that is consumed throughout the world, has been shut off by decisive enemy action from sources which formerly supplied over 90 per cent of the world's rubber. We are now engaged in a grim race against time. Several hundred thousand tons of new rubber, or its equivalent, will shortly be urgently needed to manufacture the wide range of war products required by the armed forces of the United Nations and to keep our vital industrial plants and essential transportation functioning.

The crisis that we face resolves itself into a question of whether we can bridge the gap until synthetic rubber manufacturing facilities, now under construction within our country's borders, are producing the huge quantities of this indispensable material that we shall need to win the war. Every now and then someone states publicly that the best way to solve the rubber problem is to lick the Japs. The thrilling and heartening news that has come to us in the last thirty-six hours is clear evidence that we know what the objective is in this war: to defeat our enemies. But I want to say that those responsible for the logistics of rubber are not taking into their balance sheet any rubber or any source of rubber that is now held by the enemy.

It seems odd that we should be faced with a crisis in rubber when we stop to consider that rubber originated right next door to us in South America, where native or wild rubber trees are situated. The seeds from which the extensive Eastern plantations have sprung were collected in South America in 1876. But by 1900 no more than 10,000 acres of rubber had been planted in the East.

The rubber plantations of the world now covering an area of 9,000,000 acres had in 1941 a productive capacity of 1,600,000 tons a year. The world's consumption during 1939 through 1941—a record three-year period—was at the rate of 1,100,000 tons a year, which left a potential surplus of 50 per cent.

It has been my privilege to visit the Eastern plantations and to witness rubber manufacturing in most parts of the world, including Germany and Japan. In the course of many visits to Germany during the 1930's, I observed at close range the development of an imposing synthetic rubber industry, as that nation prepared for the war that is now resulting in the greatest death and destruction known to mankind.

During the war of 1914-1918, Germany had an inferior synthetic rubber. Research and development work—started at that time—has been diligently continued and intensified ever since. Today Germany is probably living at least 75 per cent on synthetic rubber.

Based on what I learned in Germany and Japan, and on what I had become convinced were the aims and policies of the Nazis and the Japanese militarists, it has since 1937 been my belief that our country could not afford to be without a national insurance policy in terms of rubber. The only alternative was to have our entire national economy continually threatened by the possibility of disruption of the long rubber life line to the Far East.

In June 1940 the stock of rubber in the United States totaled only 168,000 tons. The consumption of rubber for the year 1940 was 648,000 tons. The position of about three and a half months' supply was anything but a healthy one for our country and for its economy.

This precarious situation could be corrected only by a two-point program. To make certain that a continuing supply of rubber would be obtainable, new and dependable large-scale sources of rubber had to be created quickly here at home. And meantime, the accumulation of reserve stocks would provide a temporary bank on which to draw until American-made rubber could meet the national requirements.

In early June 1940, knowing that rubber was too vital a material to be left to chance, the B. F. Goodrich Company decided to take action. At a reception in New York nearly two

and one-half years ago we introduced for sale to car owners a tire in which American general-purpose synthetic rubber replaced natural rubber by more than 50 per cent. This American man-made material was developed by our organization after a research program which was started in 1926, and was even then, in 1940, being commercially manufactured in our own plants.

Although we felt, and so stated at that time to the Senate Military Affairs Committee, that synthetic rubber could be produced on a large scale at a cost of approximately 25 cents a pound, yet we knew that large-scale production of synthetic rubber could not be justified on an economic basis by industry.

Industry had to take a long-range view, remembering that as recently as 1933 crude rubber sold in New York at less than three cents a pound. The 1940 current market price of 20-22 cents a pound was artificial, having been brought about by restriction of production of plantation rubber and by war uncertainties. We knew that a cent a pound variation in the price of rubber amounted to approximately \$14,000,000 a year, based on a consumption of 600,000 tons a year.

Without artificial production restrictions, natural rubber in normal times might have a price advantage of 10 to 15 cents a pound, based on known processes of manufacturing synthetic rubber. This might mean a difference of from \$135,000,000 to \$200,000,000 a year, or certain disaster to private capital invested in general-purpose synthetic rubber plants.

But our company pressed on and sold quite a few of those synthetic rubber tires, in 1940—several thousand of them—to coöperative firms and individuals who were willing to pay a higher-than-market price to help us get an American general-purpose synthetic rubber program started. We did accomplish the two main objectives that we had in view at that time. Our announcement focused the attention of the nation on our critical rubber supply situation, and we believe that we challenged the scientists throughout the country to increased efforts in the whole synthetic rubber field.

Shortly after this step by our company in June 1940, our government took constructive action. Plans were put into effect for purchasing large reserve stocks of rubber. Under this arrangement the British and Dutch plantations removed the restriction of output bans and produced at capacity.

We had recommended the construction of two or more government-financed large-scale synthetic rubber plants by competitive industrial organizations. But synthetic rubber seemed at the time too revolutionary a step for prompt action on such a scale. A great potential capacity on the other side of the world for growing natural rubber was available, and the cost of creating synthetic rubber plants was admittedly high when figured in dollars.

Two and a half years ago, before advocating American stand-by synthetic rubber plants as the only practical solution, we had given full consideration to other sources of rubber supply.

Our good neighbors, the South American countries, could then provide little more than five per cent of our peacetime requirements of rubber. Six or seven years are required to grow a rubber tree ready for tapping. It was estimated that it would take ten or more years for South America to supply substantially more rubber through increased planting. Africa was then supplying less than one per cent of the world's rubber, and even if that continent produced sufficient quantities, we should again be depending on another hemisphere.

Guayule, a shrub grown in Mexico and southwestern United States, and supplying less than one per cent of America's consumption, was investigated. Our company has used guayule for more than thirty years and has been the largest consumer in the world of this type of natural rubber. Guayule is a serviceable rubber, but with the seeds then available, the time of growing would be too long for increased planting to meet the emergency that faced us. Seventy-five thousand acres of guayule are being planted by the United States government, but in all probability this will not be harvested until 1945, when 50,000 or more tons should be obtained. Finally, we read that Congress has authorized the planting of an additional 500,000 acres, and, of course, if planting is taking place, that rubber will come into being sometime after 1945.

But none of these sources of rubber was, in 1940 or in 1942, prepared to supply our emergency demands. Synthetic rubber, a product of American science, is still our hope.

It was not until the bombs fell on Pearl Harbor that a large-scale synthetic rubber program was announced by our govern-

ment—400,000 tons a year—authorized in January 1942. Unfortunately at that time no over-all planning of structural materials, equipment and raw materials had been carried out. We were weak in logistics.

Hindsight is always easy, and it is readily understandable why the vast majority of people, even some who had spent a lifetime in rubber, did not foresee during 1940 and 1941 the possibility of the rapid train of events that have since deprived us of 90 per cent of our rubber supply.

But that is water over the dam. It is not the past but the future which will determine our fate.

The January 1942 authorization of a total capacity of 400,000 tons a year of butadiene synthetic rubber, estimated to cost \$400,000,000, has since been increased and the present program is made up of plants designed to produce 705,000 tons of the butadiene type rubber, 132,000 tons of butyl rubber and 40,000 tons of neoprene, or a total of approximately 900,000 tons a year, with an estimated plant cost of \$700,000,000. In addition, Canada is carrying out a program for creating a capacity of 40,000 tons a year of the butadiene type rubber, and I believe that Russia has been producing as much as 50,000 tons a year.

Our company has recommended that we refer to the butadiene type rubber as AA (Double A), an abbreviation for All-American. We object strenuously to calling this new rubber by the German name buna. The AA rubber, as we term it, will be produced in plants designed, constructed and operated by American engineers and will be made by a process incorporating the best features of the All-American research and development of the companies participating in the government program.

Undoubtedly you would like to know something of how AA rubber is produced. The basic raw materials are three parts of butadiene and one part of styrene. Butadiene is a gas which can be made either by cracking petroleum, or by removing hydrogen from butylene, a by-product in the manufacture of high octane gasoline, or by catalytic conversion from alcohol. No matter from what basic material it is prepared, the resulting butadiene when properly purified is the same. There is no difference in the quality of the rubber. The other raw ma-

terial, styrene, can be most conveniently manufactured from the aromatic hydrocarbon benzene obtained from coal tar and ethylene, a gas which is a by-product in most petroleum refineries.

The responsibility for the construction and operation of the plants to produce the butadiene and styrene to be used in the manufacture of All-American synthetic rubber has been delegated to the petroleum and chemical industries.

To the rubber companies has been given the task of building the polymerization, or synthetic rubber, plants and of producing AA rubber from raw materials supplied to them mainly by the chemical and petroleum industries.

In the polymerization process, butadiene, which has been liquefied by compression and cooling, is mixed with styrene, soapy water, and several minor "salt and pepper" ingredients. This mixture is then heated and stirred under pressure, whereupon the molecules of butadiene and styrene join together to form an emulsion of synthetic rubber which is quite similar in appearance to the latex obtained from rubber-producing trees. From here on, the process of obtaining sheeted rubber is like that used for natural rubber.

This morning in Mr. Kaiser's very inspiring talk, he said that of all the commendable titles that had been given him, he liked best the title, "magician"; and he liked it for the reason that a good magician always has assistants. I can tell that I have many assistants in the manufacture of synthetic rubber on a large scale. Also I am not a magician, but for this assignment, our technical people who usually perform this little experiment decided that I should be thrown on my own resources. Man power is too valuable these days to send two men to do a job.

Now I have here butadiene in a liquid form. It looks very much like water, but I was told by the scientist who packed my kit that this is under great pressure and, if by any chance I dropped it, it would explode and might ruin most of New York. Here I have the styrene which looks very much like butadiene. Here are the soap flakes that are referred to.

In this bottle is some All-American AA latex to which I referred. As I remarked, it looks very much like the latex that comes from rubber trees. Here I have the coagulant which I pour slowly into the latex. You may see something forming

that begins to resemble a solid mass. I do not do this exactly as our scientists do it. Mr. Kaiser this morning built a ship in six minutes and twenty seconds, I think it was. I have not timed myself, but I hope that we are going to make just a little piece of rubber in less time than it took him to build a ship in this room. Most of us know rubber by whether or not it has the quality of bouncing.*

Already much that is good and several things that are bad have been discovered about the usefulness of this new rubber. Test tires, whose rubber content is 99.84 per cent of this synthetic rubber, are running on the highways in various parts of the country. Passenger car tires and small-size truck tires give excellent service. However, when we come to the manufacture of large-size truck and bus tires urgently needed for military use, several difficult problems arise due to the fact that synthetic rubber tires in service generate more heat than natural rubber tires, thus causing an earlier failure. We are now hard at work on this problem and we are confident that it can and will be solved as we gain more experience in the field.

Even now, almost all essential rubber articles can be made from AA rubber—including hundreds of important products used by the armed forces of the United Nations.

When will the production of this man-made rubber fully meet our necessary requirements? Certainly not until 1944. Compared to our consumption of 765,000 tons of rubber last year in the United States, we shall produce about 32,000 tons of American-made rubber this year, practically all from privately financed plants. The privately financed plant of B. F. Goodrich, Akron, today is producing more of this rubber than all the other plants put together, both private and government.

In 1943 the government plants will come into big production and estimates for all types range from 300,000 to 500,000 tons, and in 1944, from 700,000 to 1,000,000 tons.

This tremendous program for man-made rubber in quantities sufficient to meet our vital requirements must be fulfilled or the nation will, in a matter of months, be confronted with a critical situation highly dangerous to our military forces and our whole civilian economy. We must have rubber to win the war. Late 1943 will see our stocks of rubber, and those of our Allies, nearing exhaustion.

* At this point Mr. Collyer bounced the ball of synthetic rubber.

It is imperative that we have the utmost speed in building and equipping the giant plants and in the actual production and use of man-made rubber. Every day lost now means irreplaceable loss of rubber, for we are living on our fat; and our fat is rapidly disappearing.

The construction of the government synthetic rubber plants is one of the most highly technical and complicated engineering jobs of all time. Several hundred thousand tons of critical materials will be used. These materials, necessary for the construction of the plants and equipment, must be made available promptly or there will be further serious delays in completion of the production facilities so urgently needed. Thousands of skilled mechanics, pipe fitters, electricians and construction workers are required, and I feel that unusual measures will be necessary to make them available when needed.

We must have enough rubber in time—and not too much, too late. Mr. Jeffers, our rubber administrator, and his organization are working day and night on every phase of the problem, and particularly on structural materials and skilled man power.

I have said that the real crisis in rubber will come next year. How well we shall meet and pass the 1943 crisis will depend mainly upon our ability to conserve rubber and to produce synthetic rubber. This statement of fact is made clear in the constructive and timely Baruch committee report, which I feel would provide extremely interesting reading to the members of this Academy. The Baruch committee, while critical of the handling of the rubber problem, did report encouraging progress in synthetic rubber, as for example the following:

Our committee is convinced that the government's present program is technically sound. From this time on, the important thing is to get on with it without delay.

It is our firm conclusion that present processes for manufacturing synthetic rubber and raw materials required must not at this late date be changed unless new processes can be shown beyond peradventure to have such advantages over those now employed that more rubber would be obtained in the ensuing months than would otherwise be the case. We have found no such process in the course of our investigations.

I think it is important that we consider another statement made in the Baruch report: "Probably the most interesting and satisfying part of our study is the confidence we have acquired in the men from industry who have the plans in hand and who are satisfied they can lick the problem in the given time. Their

competence and experience, their resourcefulness and ingenuity, are the best guarantees that we can do so."

The stark fact that lack of rubber could cost us this war is clearly stated and fully explained in this enlightening report, which should be a constant reminder to us that we must never again become wholly dependent on distant sources of rubber supply.

Fortunately, thanks to the farsightedness of our government, we had in our country, when the Eastern plantations were captured, approximately 600,000 tons of rubber, which is a normal year's supply for our country. I mentioned that in June 1940 this total was only 168,000 tons. Our stocks of crude rubber and that contained in finished products, as well as our stocks of scrap rubber and reclaimed rubber, must bridge the gap until synthetic rubber becomes adequate for military and essential needs.

Rubber in tires on cars now on the nation's highways actually constitutes the largest stockpile of rubber in the country—approximately 1,200,000 tons, or nearly double our total crude stocks at the beginning of this year. The Baruch committee, in recommending mileage rationing, recognized the absolute necessity to our war effort of keeping all cars in operation for essential driving.

We in B. F. Goodrich feel now, as we have for the last two years, that all cars are essential cars, but that all driving is not essential driving. The government now has a program to convert that basic fact into a nation-wide conservation habit.

The purpose of the rationing program, which will begin nationally on December 1, is to insure on a fair and just basis the operation of all passenger cars for essential driving, with a minimum consumption of rubber, reclaimed rubber, and rubber substitutes.

I am confident that we shall all respond with good spirit to the requirements of the mileage rationing program until synthetic rubber becomes available in quantities for civilian use.

I am informed that the 35-mile speed law, now a national regulation, is being splendidly observed. Sales of gasoline in unrationed areas have already sharply decreased, reflecting a reduction in mileage that is startling only to those who underestimated American willingness to make personal sacrifices if they will help to win this war. That to me is most heartening.

It proves that the American people will respond even to bad news if they know fully what is required of them.

This war, more than any war in history, is a conflict of materials and resources, as well as a battle of men. Rubber is one of the strong and versatile threads that we must weave through the fabric of our industrial production and transportation systems to supply and maintain our modern armies and navies.

By contributing to the solution of America's rubber crisis, each one of us will do a wartime job of No. 1 importance. Any circumstances or any policy that prevents the effective functioning of our home front industries and essential transportation can be just as disastrous to our war effort as a defeat in battle.

Our gallant fighting men know that courage alone is a thin weapon against Axis planes and tanks. They look squarely to our country to deliver in time, and where needed, superior weapons and equipment—weapons and equipment which require thousands of tons of rubber.

The design, construction and capacity operation of our many giant synthetic rubber plants—in time—will be one of the greatest industrial achievements of all time. Conservation of rubber must bridge the gap until our rubber problem has been solved.

Industry is supremely conscious of its part in this grave responsibility and the American people are now fully conscious of their important rôle.

REMARKS

CHAIRMAN MORGAN: We are grateful to Mr. Collyer for his most illuminating talk and his interesting demonstration.

On the editorial page of *The New York Times* is an extremely interesting column, written by a perceptive eye. The possessor of that perceptive eye is with us this afternoon. His views on the services of supply are known to us in part. I am going to ask him to expand his views for our benefit now. Mr. Arthur Krock.

MR. ARTHUR KROCK: Mr. Morgan, Ladies and Gentlemen: This program says, "Under the ten-minute rule", and I assure you that I will stick to that rule. I will put on my "perceptive eye" now. [Putting on his spectacles.] [Laughter]

THE ARMED FORCES—THEIR MOVEMENT AND SUPPLY: DISCUSSION

ARTHUR KROCK

The New York Times

WE have heard today from each specialist that upon his particular field of operation depends the winning or losing of the war; and that, of course, in each instance is true. Transportation can win or lose the war, and Mr. Stolper, it seems to me, gave us some reason to hope that the shift in Hitler's direction from east to west is going to cripple him considerably.

Logistics, definitely, especially in the eloquent description that General Somervell sent through Colonel Detzer, is a vital element in winning or losing the war.

And finally, what none of us needed to be told, but were told very impressively by Mr. Collyer, rubber can win or lose the war.

But everything that everyone said, it seemed to me, brought the subject back to its base, the question of man power. That is the undecided and, to my mind, the most difficult as well as the basic problem.

There is a meeting at the White House today, and, perhaps, when you leave this room a plan for handling the man-power situation may have been evolved, though the machinery still must be set up and many changes in our legislation and national life must be made to set it in motion.

Today is only eleven months after Pearl Harbor and three years and two months after the war broke out in Europe, four and a half years after the President was convinced that the war would break out in Europe, a year and a half after he knew we would go to war with Japan!

I was interested that General Somervell via Colonel Detzer failed to mention one very successful user of logistics, who never heard the word, I dare say, but who said he won battles because he "got there fustest with the mostest men." That was General Forrest. Of course, he found his supplies as he went.

I was also interested in another phase of General Somervell's speech, which makes it absolutely certain that the speech was passed by O.W.I. He gave us the new term, "soda-fountain strategists". It is not very clubby for O.W.I. to talk about "typewriter strategists" because they operate wholly with typewriters. General Somervell

also failed to mention that, when Moses was giving his great exhibition as a logistician, Jehovah took over the commissary at one very important point. I think if we do not hurry up, He will have to take over ours.

At the base of the man-power question is the size of our Army, something that has not yet been decided. Secretary Stimson fixed 7,600,000 for the Army, to which you must add 1,500,000 for the Navy, up to the end of 1943, and that decision for ratification is on the President's desk. Until it is made, it is absolutely impossible to decide the other points of the man-power question.

The Army now has in existence, or at least in skeleton form, 72 divisions for the year 1943, and it wants 85 to 90. There is a great deal of dispute about that on which I am in no position to have an opinion, it being largely a military and logistical problem, but it seems to me that the critics of an army of that size have made a very good case. Because, if we are to build an Army and keep 1,000,000 or 2,000,000 men unequipped and in this country, we are hardly carrying out the purpose for which our Army was formed in the first place. I happen to know that those who are given the responsibility of the tremendous job of transporting this Army, among whom is the illustrious President of this Academy, would very much like to see the size suggested by Secretary Stimson cut down by 1,000,000 or 1,500,000.

The effect, of course, is not only on our own economy and our own supply but on lend-lease. It is entirely possible, if we had tried to build an army of 10,000,000 men in addition to a navy that has to be recruited—and you will recall that at one time General Hershey spoke of 10,000,000 men and Mr. McNutt, who is much more liberal, spoke of 13,000,000—lend-lease would have dried up. It would have been impossible to supply our Allies with anything like our commitments, if we had built up such a military force ourselves.

The British, Chinese and Russians already are complaining about the reductions of our commitments in lend-lease, and the British have asked what degree of precedence is in the mind of our commanders between training and equipping a great home army and expeditionary forces and supplying the Allies. It seems to me they got one answer the other day when we landed in North Africa.

Unified command, which is a subject exceedingly unpopular at the White House but actually very popular below the top rank of the Army and the Navy Departments, would also help adjust the problems of allocation.

We now have a board which, of course, has the right to take any orders marked for any of our Allies and turn them over to the

American forces; but that becomes a political question and makes certain difficulties, so it is not as effective as a clear system of allocations.

Mr. Churchill, when we were debating lend-lease, said that if we would give him the tools, the British would finish the job. Of course, at that time the war had not become global. After that, the Japanese attacked Pearl Harbor, and the war went to the uttermost limits of the earth and made very great extra demands on us for our own troops. That was coeval with Singapore and Burma, and Rommel's very great advance in Egypt followed shortly thereafter, so that Mr. Churchill's prescription did not last very long. We are required to produce a very large number of fighting men, but the question is whether the proposed size of the Army has not gone beyond the necessities of the situation.

The labor pool is the next problem, and of course that is equally basic. The Administration's policy, in favor of high wages and various social advantages, social security and different kinds of bounties and protections, has been luring workers from the farm for a very long time and creating a desperate situation, particularly in the dairy industry. We managed to harvest the crop this year, but that is not in sight next year unless there is a tremendous change in the deferments and allocations of workers.

The local boards have been given quotas by General Hershey's organization, and they are very faithful and dutiful and very proud, especially in the country districts where the farm boys do not want to seem to be slackers and insist on going into the Army. The local boards gratify them, with the result, as I say, that the farm labor situation, as you all know, has grown very acute.

We did not follow the example of the British which was, as usual, quite wise. When they began recruiting their army, they set aside the skills because they knew that their supply problem was an equally great one, and instead of taking men into the army to use their skills there, they kept them outside the army to employ them in production. That is one of the reasons why the British production has been so extraordinary, and we actually, by rate, have not caught up with it yet.

In our Selective Service System, we have put skills in to a great degree, and that has dislocated the industrial market here. There has been no clear Selective Service policy on farm deferment for a very long time, though they are coming to one now. If and when a manpower board is set up with authority in all fields, a chairman acting for the President, with jurisdiction over both Mr. McNutt and General Hershey, a jurisdiction I hope he will have—though

I think Mr. McNutt expects to be that chairman — will make it possible to develop a policy of deferment and allocation. But even then the migration of workers has got to be regulated or stopped. The volunteer system, whereby boys are still urged to come into the Army or the Navy, regardless of their place in this great scheme of logistics, must be changed. Volunteering cannot go on under an orderly man-power system.

There must be an end to absenteeism which employers have tolerated because there is nothing they can do about it without getting into trouble with the Labor Relations Board. This means that a man, who has had a particularly good pay check, often just stays away on Monday for a couple of days, and there is no way to bring him back. That is a very serious industrial problem at the moment.

Then, there is our forty-hour work week. The British are able to work forty-eight hours on an average in war industry, and by war industry they mean all industry, which is accurate. (I can think of no industry that has not some relation to the war itself.) But we have felt that fatigue sets in after forty hours, except for a generous dose of overtime.

The question of delaying the eighteen and nineteen year old draft is much less complicated. I notice that Mr. T. H. Thomas, a few days ago in the *Times*, had a very impressive piece in favor of it; he is a military expert and he may know. I do not. It seems to me that the Army needs young soldiers and should have them, but I am not competent to discuss that at all.

We have steadily raised our sights, which is another great complication in this matter. There has been a debate in Washington for a long time whether it is wise: that is, whether you get results by shooting for the moon, or whether it is better to set a more practical production point. Mr. Nelson and the President decided to shoot for the moon, that this was the thing to do. So we moved up the Army to 2,000,000 and then very quickly to 4,000,000, and now, as I say, Secretary Stimson suggests 7,500,000. That, in the absence of an orderly system of control, is particularly upsetting.

There must be 50,000,000 of our labor pool, totaling perhaps 61,000,000 or 62,000,000, to supply the 8,000,000 to 10,000,000 who will be in uniform and then there must be 1,000,000 or 2,000,000 to take care of the civilian economy. But beyond that there are at least 1,000,000 and perhaps 1,500,000 in the lists of those who are engaged solely in the business of policing their fellow-citizens with the rationing that is going on. We are supposed to avoid everything that is compulsory. Yet everybody knows that censorship is compulsory and rationing is compulsory. But whenever we as a

people face the word "compulsory", even in a desperate war like this, for some reason or other we try to pretend it is not so. At any rate, there is plenty of compulsion in the rationing boards; and one reform might be a sincere attempt to cut down the complicated questionnaires and regulations to a point where we could at least administer that part of it with a much smaller force of men, which would in itself release a goodly number to industry and the armed forces.

Naturally women and children will have to come into the working field—and very soon (that is, as soon as this plan is evolved and the machinery is set up and put in motion and when the argument between Hershey and McNutt and the Employment Service and a few other people is settled). When they come in, I have a feeling that American women and children can do as well as the British, and, if they do as well as the British, they will have done magnificently.

I do not see how we can continue to have strikes in a system of allocation like this; but in fairness it must be said that with the exception of one outburst the other day, organized labor seems to be in a fairly good mood now. The mind of labor seems to be against strikes.

Rules of employment, whereby no man can be permitted to get a job unless he is certified by the United States Employment Service as not having left a place or had a bad record, will also have to be instituted.

These are just a few rambling thoughts on the subject. I think you have been talked at enough this afternoon and I appreciate the opportunity of outlining the situation as I see it.

REMARKS BY THE CHAIRMAN

CHAIRMAN MORGAN: Thank you, Mr. Krock.

I think these keen observations by Mr. Krock bring to an appropriate close this session of the Academy meeting, which, I might say, together with this morning's session, ranks among the very best that I recall.

PART III

THE UNITED NATIONS

INTRODUCTION *

FREDERICK P. KEPPEL, *Presiding*

Member of Board of Appeals on Visa Cases, Department of State
Member of the War Relief Control Board

MAY I ask you to rise for a moment. I wish to offer you some toasts.

"The President of the United States."

The next toast, with Mr. Butler's permission, I will offer in the old-fashioned English way. It is to King George: "The King, God bless him."

And now, to the leaders of Russia and of China and of the other United Nations and to the leaders of the Fighting French. I offer you: "The Leaders."

And now I should like to speak for a moment about an essential commodity. It is a commodity in the using of which there is no scrap pile provided for future salvage. When it is gone, it is gone forever, and that commodity is time. I wonder if you and I cannot come to some agreement with reference to the use of that essential commodity tonight. If you will agree to remember who our speakers are, what they have done and what they are doing to make us so proud to have them as our guests tonight, I will agree not to tell you a great many things about them that you know already.

And there is another reason: they are all modest men, and it is no true hospitality to put them in the position of the flap-jacks upon which the molasses of adulation is being publicly and relentlessly poured from a wide-mouthed jug.

Does the Chair hear a motion that the proceedings shall be conducted as indicated? The Chair hears a motion. Is any

* Opening remarks at the Third Session of the Annual Meeting.

objection offered? The Chair hears none. Does anybody demand a roll call? The Chair hears no indication. It is so ordered.

And now, I have the honor of calling upon Mr. Harold Butler, the British Minister in Washington. Mr. Butler! [Applause]

REMARKS

THE HONORABLE HAROLD B. BUTLER: Mr. Chairman, Ladies and Gentlemen: I have heard the two toasts which you proposed just now associated before and whenever I have heard them associated, it has always given me personally something of an inner thrill. I have spent a good deal of time in this country as well as a certain amount of time in my own, and perhaps that is to some extent a personal reaction, but I do feel that there never was a moment at which the association of those two toasts was so appropriate as it is this evening.

We are now—when I say we, I mean the United States of America on the one side, and the United British Nations on the other—embarked in a very great adventure.

[Mr. Butler then read his prepared address.—ED.]

THE UNITED NATIONS

THE HONORABLE HAROLD B. BUTLER
British Minister in Washington

WE have just lived through an historic week. The officers of the Academy are to be congratulated on the prescience with which they chose the date of this dinner, though they can hardly have dared to hope when they planned it that it would meet under such happy auspices.

In these last seven days we have witnessed two very great events. First of all there came the sudden joyful news of the devastating defeat of the Axis armies in Egypt by the forces under the command of Generals Alexander and Montgomery. Though the greater proportion of their troops were British, they included divisions from Australia, New Zealand, South Africa and India, from the heroic Greek Army and from the gallant army of the Fighting French. In the air the R. A. F. contained pilots and crews of many nations and were assisted by a powerful force from the United States Army Air Corps who took all their share of the battle. It may therefore be said that this was the first great victory of the United Nations over their enemies.

But it was not won by the fighting men alone. It could not have been achieved without the hard toil week in and week out of the men and women in the factories of Britain and America, the two great arsenals of democracy. Their labor is now bearing fruit in the endless flow of war materials which is going to destroy the predatory armies of Germany and Japan. But that labor would have been in vain but for the dour courage of the merchant seamen from so many nations, who ferried men and guns, planes and tanks, over thousands of miles of water, infested by submarines, under the vigilant guard of the American and British navies.

But this victory is only the prelude to other great events, which will decide the destiny of the human race for hundreds of years. It has been promptly followed by the portent of a great American army landing on the shores of North Africa, a portent so plain and so tremendous that it cannot fail to be

understood by our friends and our enemies alike. They must now know what is coming to them—liberation to those who are enslaved under the Nazi yoke, death and disaster to Germany and her satellites. It has sent a tremor of hope running through all the occupied countries and a tremor of fear through the black hearts of those who planned this war. To see that, one has only to read Hitler's hysterical protestations that he will never capitulate.

That great statesman and warrior, General Smuts, has hailed the sweeping events of the past week as marking the turn of the tide. At last after much anguish and frustration of spirit, all of us who belong to the United Nations feel instinctively that we are on the right road. It is not, perhaps, the road that has been advocated most assiduously, but I for one feel complete confidence that the planning of Admiral King, General Marshall and their British colleagues of the Combined Staffs will prove to be sound and farsighted and fruitful of decisive results. In spite of all the talk and all the articles of the last six months, I remain obstinately unconvinced that we civilians can do their job as well as they can. For my part I am quite content to leave the conduct of future operations in their hands. In the dark days behind us our sailors and soldiers and airmen enabled us to avoid defeat by their tenacity, skill and endless courage in the face of great odds. As the balance of man power and machine power tips more and more in our favor, I am quite sure that they will know how to lead us to crushing and complete victory both in the West and in the East.

But when that victory is won, we shall be confronted with problems not less difficult than those which we are now trying to solve in winning the war. I should only like to present two thoughts as to the method of solving them. The first is that none of us can solve them alone. We have got to work together. Fortunately, the war is already creating some of the machinery of coöperation which will be needed when peace comes. Not only in the field of military strategy, but also in the field of shipping, supply, finance and in many other directions there is a degree of common action based on common planning between the nations concerned, which is being carried further than at any previous time. That is a good omen as far as it goes, for it shows that coöperation for war purposes is a practical possibility.

It has still to be shown, however, that similar coöperation for peace purposes is equally feasible. War against a common enemy produces a bond and a sense of urgency which are apt to relax when the fighting is over. Do we sufficiently believe that the future of the world can be successfully planned and carried out only as a more or less common enterprise? If we do, then it can be done. But it cannot be done unless the will to do it is there, based on the firm conviction that it *must* be done.

After the last war, there was a strong belief that some system of collective security was necessary for the maintenance of peace. It took shape in the League of Nations, but the will to make it work was not strong enough to secure collective action in the face of the challenge first of Japan, then of Italy, and finally of Germany. Most countries still thought that they could get by without committing themselves to a system which meant that everybody took his share of doing the policeman's duty if any gangster nation tried to break the peace. Unless the democracies become fully convinced that this is a common duty in which they all must participate, there will be no United Nations after the war—and probably no peace for any long period. We have still got to turn the term "United Nations" from a phrase to a fact.

The other thought which I should like to suggest is this. Unity between nations cannot be brought about by argument. It must rest on sentiment—on the sentiment of common interests and common purposes, but still more on a sentiment of mutual confidence. If we are going to get that confidence, we have got to concentrate on one another's virtues rather than on one another's shortcomings. We all have our share of both. I suppose that few of us think that our friends are necessarily perfect specimens of human nature, but by dwelling on their good qualities and by turning a blind eye to their weaknesses, we continue to value them as friends. With nations as with individuals, understanding can be fostered only by a generous approach. We have got to take the trouble to know more about one another's affairs, to understand one another's difficulties, to appreciate one another's merits.

Under the stress of war we are learning to do these things. We are getting a sense of common discipline and common sacri-

fice. We are learning to plan in common and to act in common. We are learning to know one another better, to discard ancient ignorances and prejudices, to see the validity of ideas and practices of other people which are strange to us. In this way we are learning to have confidence in one another without which we certainly shall not win the peace. If we can convert the solid wartime alliance of the United Nations into an institution of permanent value, then we shall be able to assure the peace of the future, for without peace and the assurance of peace none of the Four Freedoms can be realized. There is no other foundation for our hopes of tomorrow. [Applause]

REMARKS BY THE CHAIRMAN

CHAIRMAN KEPPEL: Thank you, on behalf of all of us, Mr. Butler.

I now present Mr. Joseph Grew! [Applause]

JAPAN AGAINST THE UNITED NATIONS

THE HONORABLE JOSEPH C. GREW

Former American Ambassador to Japan

FOR more than ten years it was my responsibility to act as the representative of the United States in Tokyo. Throughout that time I was aware of the portentousness of American-Japanese relations. It is scarcely a confession for me to admit to you that this responsibility was the weightiest—and at the end, the most sorrowful—which I have ever borne. Yet in coming before you tonight, I feel that I am carrying out a mission even more urgent, even more weighty, than the one I undertook in Tokyo. In Japan, I served as the representative of the American people and government; with my colleagues in the world-wide system of the Foreign Service, I sought to hold America's diplomatic front against the threat of crisis and war. But in coming before you tonight, I carry no formal diploma. My mission is not to any one of you alone, but to all of you. I am charged by my own knowledge of dangerous truth to put that truth before you. I can succeed only if I make this truth plain to each of you.

The truth I bring to you is simple. It is the story of the power of our enemies, the Japanese. I bring this story to you almost directly from Tokyo; it is not so many months ago that I lived in the midst of our enemies, that I beheld their power, and saw the "glory" which they thought their weapons had achieved. Even in coming back to America, I saw further evidences of the terrible power and successful criminality of Japan. I saw one of the world's greatest naval bases—Shonan on Shonan. A huge city fed the commercial and war fleets of victorious Japan. Rubber and oil were plentiful—for Japan. Out of sight, but known to be there, huge shipyards and dry-docks worked for Japan. A cosmopolitan population, vast in number, and including thousands and thousands of English-speaking prisoners, worked in bondage for Japan. That was *Shonan*—which is the Japanese phrase for Southern Glory. Not so long ago, we knew it as Singapore.

We cannot and must not deceive ourselves about the war in the Pacific. Japan launched the northwestern and far western Pacific campaigns. These were a war in themselves, and Japan has temporarily won that particular war. Japan has beaten us in the Philippines—and our allies in neighboring areas—as she has never beaten the Chinese in China. What we now face is a long, slow recovery of our own losses—only ultimately the attack on the enemy's own cities and bases—if we do not realize the magnitude of the task, and equip ourselves for it. We rejoice at each victory of our armed forces in the Solomons, forgetting that a few months ago the Solomons were uncontested British territory. We must remember that each victory won today is only a steppingstone in the rolling back of Japan's advances.

Let me tell you why Japan succeeded. Let me present the case to you forthrightly and simply. To you, I am no representative of a foreign Power, pleading for the recognition of a cause. I am your own former ambassador from Tokyo, and I plead for nothing but the truth. This truth can be put in three sentences:

Japan temporarily won the struggle for the western Pacific because Japan was immensely strong—physically strong, technically strong, militarily strong, and most of all, psychologically strong.

Japan—the Empire of Nippon—was strong when the war started, but the new Japan—the great slave empire of the Greater East Asia—is today *potentially* the strongest Power in the world.

Japan can be beaten; but Japan can be beaten only by physical and moral strength equal to or greater than her own, and that strength can be supplied only by the all-out effort of all Americans.

There you have it. These three sentences are all I have to tell. Some of you may see the picture, the whole picture, now. Others may prefer that I follow out, in general terms at least, the implications of these statements.

First, Japan is strong. Japan is not a little country. The Japanese are not a little people, except in stature, and they more than compensate for stature by vigor and skill. There are more Japanese than there are Englishmen, or Frenchmen, or Italians.

Japan is about as populous as the German Reich, and each single Japanese is a part of an effective war machine. Man for man, nation for nation, Japan measures up to the highest standards of organized power in the modern world.

Japan is civilized, in her own way. This civilization is deep and beautiful, but its culture has a streak of brutality and subservience in it which makes Japanese ideals alien to ours or to the ideals of the Chinese, or any other of her neighbors. Japan was well ordered and metropolitan when New York, in our infant Republic, was a small commercial port and Washington a scattered village in the thickets along the Potomac. At that time, the Emperor Napoleon never saw—perhaps never knew about—the largest city in the world he sought to conquer. That city was not his Paris, nor the London he sought to conquer, nor the Moscow where he met his nemesis; that largest city was Yedo, which we know as Tokyo, where a vast dictatorship held a great urban culture under absolute and unrelenting control. Out of this old, big, rich, strange civilization, there emerged the power and brutality of modern Japan. It was no miracle that Japan adopted our machinery and our weapons so rapidly: Japanese civilization did it—despotic, sophisticated, military civilization.

Japan is unified, and pervasively governed. The Japanese live by their own rules. They swept ahead of Asia by the dictates of their rulers. They were accustomed to authoritarian, totalitarian government from the ages of their past growth. When Hitler was a maladjusted, unhappy student, and Mussolini an ardent young radical, the Japanese military leaders were men of foresight and ruthlessly cold vision. They already had an obedient, faithful people at their command—a people who believed in the rule of the warrior, in the *unfreedom* of the common man, in the superiority of the Japanese race to all others, and in the absolute incontrovertible rightness of what their government did. Japanese democracy never went behind these assumptions; Japanese freedom never included the freedom to challenge the *Kokutai*—literally the *national body*—of the Empire of Japan. Hitler fought the German people first, with the Storm Troopers and the S.S., before he captured the German state and the German *Wehrmacht* as instruments of renewed attacks on free men; but the Japanese leaders never

faced an effective opposition. They inherited their power from the dictatorial, military past of Japan; when the hour came for them to bid for wider power, perhaps for world dominion, they stepped smoothly into their inheritance. Today, we probably have spiritual allies among the German people; we have few among the Japanese. Whatever they may have believed, the Japanese today support their government. That is the difference between the raw new authoritarianism of Hitler, and the old suave authoritarianism of Japan. Germany will stand just so much, and will then collapse from within; the Japanese will stop fighting only when the last platoon of infantry, and the last torpedo-boat crew on the water, have no further hope. It is my considered opinion—and in the course of two wars I have seen each at first hand—that as soldiers the Japanese are definitely superior to the Germans.

Civilized, unified, military Japan is also up-to-date. In the big cities of Japan, skyscrapers floated on pools of sand, ingeniously built to withstand the concussion of earthquake. The streets are asphalted, and clean. Buses and streetcars run regularly and well. Private homes are cheaply built, but simple and tasteful; the Japanese find them comfortable, and if one burns down, it costs a fraction of the cost of an equivalent American home to replace. The Japanese have extracted the best of their old thrift and the best of modern industrialism. They combine them. In the shadow of long-range electric power lines, the common peasants follow an intensive agriculture which keeps the home empire blockade-proof and self-sufficient. In the modern factories, which produce at speeds and standards equaling our own, the labor force lives by the old Japanese scale, and makes possible the price competition which we all knew before the war. This up-to-dateness of Japan, economically as well as psychologically, depends on the traditional Japan. The Japanese soldier or sailor who lives and fights like a Spartan is not undergoing privation; he has been a Spartan from birth. Just because a Japanese operates a battleship, a machine lathe, a modern locomotive, or a combat plane, he does not become un-Japanese; he is still a tough, simply satisfied man who believes in obedience and who is used to hard living because he has known no other. To call a Japanese worker or soldier a "coolie" is to forget the most danger-

ous thing about him: the fact that he, no less than you or I, is a man of the twentieth century and can fight, perhaps beat us at some of our own games and with some of our own weapons.

Such is the home empire of Nippon. I do not have time to tell you of the internal sea communications which make of the Japanese Empire an immense, immobile and unmovable fleet—a fleet larger than the mind of man has ever dreamed of building—anchored forever close to the coast of Asia. Islands are unsinkable aircraft carriers, and Japan is all islands. Beyond this, I wish there were time to tell you of the newly-built, up-to-date Japanese merchant marine, of the efficient navy, the huge army, the indispensable factories working at full time, the diversity and richness of the resources of Japan. You have known that these things were there; remember it now, keep it in mind, and consider with me what Japan has added.

To the home empire which I have described, Japan has added immense possessions in three wars of conquest—the war with China in 1895, the war with Russia in 1905, and the present war, which began in Manchuria in 1931. Japan has taken Korea, China's Manchurian provinces, the grain lands and coal and iron of North China, the dairy land of Inner Mongolia, the coast and main rivers of most of China, with the biggest cities of China; Japan has taken Formosa and Hainan, Indochina and Thailand, Burma and British Malaya, the vast empire of the Netherlands Indies, our daughter democracy of the Philippines, some of the British, Portuguese and Australian islands of the southwest Pacific, and the strategic Andamans in the Bay of Bengal. Militarily and navally, this new and greater empire depends on internal communications, which—in simple language—means that we have to go the long way around while they work the short way through. To contain and roll back such an empire, the encircling forces cannot be merely equal; they must be superior, and be superior in geometric, not arithmetical, ratio. Economically—mark this, for here is the very essence of danger—*economically*, the so-called Greater East Asia contains everything, absolutely everything, which a great Power needs. Grain, meat, fish, fruits, tobacco, palms for oil, sugar, rubber, oil, coal, iron, electric power, labor skilled and unskilled—all of this is there. The strong Japan which has defeated us and our allies momentarily in the Far East has be-

come Japanese East Asia. If Japan could defeat indomitable China, organize her present holdings, consolidate her position, Japan—not Germany, not Britain, not Russia, not ourselves—*Japan* could become the strongest Power in the world.

The Japanese need only one thing: time. They must try to correct their own political mistakes and military offenses. They must try to browbeat or cajole the peoples whose lands they have occupied. They must get the machinery, technical and financial, of exploitation going at full blast. Japan is entrenching herself in this empire of her conquests so rapidly that days are our most precious possessions in the war. To lose a day is as bad as losing a ship. We cannot wait. We cannot be leisurely. We cannot afford debate, or disunity, or indecision. Japan is getting stronger every hour, and this new Japan is not merely our equal; the new Japan is potentially our military superior. If we fight *there, soon, and hard*, we shall not have to fight here, later on, and with heavy handicap.

Do you not see the second of the truths I have stated: the fact that this new Japan, conceived in the invasion of China and born in the conquests of 1942, is a new, terrible power not known before in the world? We cannot let this slave empire become entrenched! I am sure that you cannot fail to see this.

As Americans, we can see the third truth in our own hearts. We know that there cannot be the slightest doubt of our own victory; but we must all see and understand that the task is a heavy one. China, the largest and most patient nation in the world, has stopped the thrust of Japanese invasion with the living bodies of her young men—indeed of men, women and children; she has built a new and unforgettable Great Wall with the heroic Chinese dead, who have died to protect free men in China and everywhere. But China has done her share, and more; China alone cannot defeat Japan. We must weight and tip the scales to victory. We cannot accept an armistice or stalemate—for the hours are with Japan, not with us. If we do not fight at our very hardest, and fight now, the period of our blood, sweat and tears may be *indefinitely and unnecessarily prolonged*. We cannot pause, or hesitate, or kill time—“as if you could kill time without injuring eternity!”

The Japanese are counting on our not being prepared to make great sacrifices. They have put great store in what they

think to be our softness. They look upon us as constitutional weaklings, demanding our daily comforts and unwilling to make the sacrifices demanded for victory. The Japanese attach great importance to what they thought was our disunity over the war issue, and they count on us to delay before we develop a fighting spirit. That delay, they feel, will give them time to obtain complete control of all East Asia. When they struck, they made no provision for failure; they left no road open for retreat. Japan is counting on *you*, on each of us, one by one, to hold back and delay the American war effort long enough for Japan to consolidate her potential invincibility. Japan needs and relies upon your hesitation, or partial effort, or doubt. It is up to you and me to see that Japan does not get this.

If we act soon, we can strengthen our Chinese ally. We can, as Mr. Forrestal recently pointed out, continue to protect Russia's Asiatic flank by holding Japan's forces in the Pacific. We can restore hope and can carry the Four Freedoms to all the peoples now enslaved by Japan. If we fight and give aid now, we shall still have allies in Asia, bases in Asia, and an enemy not yet wholly prepared. Any advantages of delay today can be purchased only at one price: larger numbers of deaths of our own soldiers and of our Allies today and tomorrow. We can buy additional hours for leisurely preparation with additional lives of our young men. We could buy peace only with our national honor and our own security. None of us wants to do this.

We must, therefore, be prepared to go forward against Japan with a full realization of the nature of our task and the gravity of our responsibility. Every adult in the United States, even every child that can walk and speak, can help in some way to promote the war effort. The troops are only the fighting front of the army which is America. We are all enlisted—of necessity—in this war for freedom. In this battle, we can do no better than to recall and make our own resolve in the words of an American soldier, Martin Treptow, who fell at Chateau Thierry. He wrote in his diary:

"I will work; I will save; I will sacrifice; I will endure; I will fight cheerfully and do my utmost; *as if the whole struggle depended on me alone.*" [Applause]

REMARKS BY THE CHAIRMAN

CHAIRMAN KEPPEL: Mr. Grew, as a member of the Academy, you have only done your duty, but we are all here to say you have done it superbly.

And now I have the honor to present Admiral King. [Applause]

CONDUCT OF THE WAR BY THE UNITED NATIONS

ADMIRAL ERNEST J. KING

Commander-in-Chief of the United States Fleet

IN what I have to say tonight you may find a certain amount of repetition, but I am told that repetition is a form of emphasis and I hope you will take it that way.

I must say also that I speak for myself alone. I speak as a naval officer of some forty years' standing, but likewise as a citizen and a taxpayer. People are sometimes classed as optimists or pessimists. I do not put myself in either class, but I do claim to be a realist.

This is a time when it is understood by everybody that our part of the war is being fought by a citizen Army, Navy, Marine Corps and Coast Guard. We are a nation in arms. We are exemplifying the principle enunciated by that great student of war, Von der Goltz, when he called war a continuation of diplomatic relations by force of arms.

In democracies such as ours the question of the political versus the military was settled in the beginning. No officer of any standing in any of our armed services ever doubts that the political dominates the military. In time of peace the Congress and the Administration in power consider questions of national policy, and then they turn to the military—I use the word military in the general sense—to determine whether those national policies can be maintained in the face of armed opposition.

The point of view of the military may be stated in George Washington's phrase, "In time of peace prepare for war"; but it is a fact known to you all that ordinarily we do not prepare sufficiently. We have never yet gone into war prepared. Certainly we did not go into this one that way. If we had been prepared to support the national policies in the face of armed opposition, we would have been in that enviable position which was voiced by Theodore Roosevelt, when he said, "You can speak softly but carry a big stick." We did a lot of speaking softly. We have always lacked the big stick.

When it comes to the relations between the political and the military in time of war, the military do not have a free hand. They cannot have a free hand, because there are political considerations which dominate the conduct of the war. I revert again to Von der Goltz' definition, "War is a continuation of diplomatic relations by force of arms." The political must enter into it. There are always questions concerning the ability of military forces to achieve the political objectives, or concerning the effect on strategy or even on operations of political considerations.

I was somewhat awed by coming to speak before the Academy of Political Science; and I suggest that all the talent which is embodied in your membership can busy itself for some time with the political relations among the United Nations, of which there are now some thirty. There are certain military considerations that enter into that picture. Eight of these thirty-odd United Nations are represented in the Pacific War Council, which meets in Washington. We have to consider the fact that Russia is at war with Germany and Italy, but is not at war with Japan as yet. The question of our relations with Vichy France has been one that has interested all of us. It has been pretty hard sledding as you know, but apparently now we know where we stand with regard to Vichy France.

The conduct of the war on the military side is settled almost entirely by the President and Prime Minister Churchill. Certainly that is true of the political factors. The Combined Chiefs of Staff are the military agents of those two political principals. It is their business to implement approved strategy. Notice that it is approved by the political principals. The Joint United States Chiefs of Staff are those who carry out the United States part of it. They, with the British Chiefs of Staff, constitute the Combined Chiefs of Staff. Note the use of words. "Joint" refers to our own Chiefs of Staff and "Combined" to ourselves and the British.

One of the political problems in the conduct of the war, and certainly one of the terrific military problems for the past ten months, has been that the forces of our side were busy on eight fronts; and you all learned two or three days ago that we now have nine fronts to deal with.

The management of the war in the military sense has led to the division of the world theater into three specific strategic theaters, as has been announced. In the Pacific theater, which is roughly east of the longitude of Singapore, the United States exercises strategic responsibility and control. The three fronts in that theater may be specified as the Alaskan, Hawaiian and Australian. The next theater reaches from the longitude of Singapore to the longitude of Gibraltar approximately, and is a sphere of British responsibility and control. The third great theater is that of the Atlantic, which is a combined theater, with the United States exercising strategic responsibility in the western part and the British in the eastern part.

The Joint Chiefs of Staff are the military agents of the President. You know the composition of the Joint Chiefs of Staff. It is their business to implement approved strategy. They are responsible for the unity of the war effort. They are the ones who are in position to specify and who have the duty of specifying what is to be produced, how and where it is to be allocated, and whence it is to be carried into the operating areas.

Now, just as the world has been divided on a combined operations basis into three great theaters, in accordance with the principle of division of labor, so in the Pacific theater it has been subdivided. That principle, of course, you will all recognize as something you find everywhere, in every form of government and every form of organization.

The Southwest Pacific theater is Australia and the enemy approaches thereto. It leads up to and includes the Netherlands East Indies and the Philippines. That is what I call a strategic entity.

The North Pacific (which includes Alaska), the Central Pacific (which includes Hawaii), and the South Pacific are under the Commander in Chief of the Pacific Fleet. That is because the fleet has to be moved from one area to another as circumstances may require. A particular matter of note is that the South Pacific area is a line of communications area, and if you will look back at the conditions that existed eleven months ago you will find that we had no cover for that. Since that time, the strong points of New Caledonia, Fiji and Samoa have been set up. Also outposts or buttresses have been extended

up through the New Hebrides; and about three months ago a start was made on getting into the Solomons to buttress further that line of communications, and at the same time to begin to deprive Japan of her northeasterly approaches to Australia. That work is still going on.

I have said before that this is going to be a long war and a tough war, and that there is no cheap way to win. We must not expect any miracles. We must not expect any inventor to come along with some magic formula or machine that is going to knock the enemy out. We have got to make up our minds that this war is going to be won by getting in there and punching and keeping on punching.

This is a machine age, and we are prone to look to the machine to do a great deal of our work; but in my view machines are not going to win this war. It is going to be won by the men who man the machines, and by no others.

I want to take a moment to point out that this tenth day of November is the 167th anniversary of the founding of the Marine Corps. There we have men who man machines or guns or anything you like in the way of fighting tools.

It has long been said in the Navy, that back in the days of Nelson there were wooden ships and iron men; and nowadays we have iron ships. I think all of us have taken some thought as to whether civilization has dulled our fighting spirit and our fighting edge. It has not. Civilization may be considered a veneer, which when the test has come has disappeared. I refer you to the men of Bataan, of Midway, of Tulagi, of New Guinea, of Algiers and Morocco. You need have no fear.
[Applause]

REMARKS BY THE CHAIRMAN

CHAIRMAN KEPPEL: Admiral, I think the audience has thanked you in its own way.

Now I have the honor to present General Marshall. [Applause]

THE UNITY OF COMMAND OF THE UNITED NATIONS

GENERAL GEORGE C. MARSHALL
Chief of Staff, United States Army

WHILE it has been advisable for me to refrain from public discussions or speeches, I was glad to accept the invitation of Mr. Douglas to talk to you because of a certain similarity of our problems, particularly during times of peace.

Both of us are concerned with a large number of imponderables. On your side you have to deal with the uncertainties of public reactions and the complications of international relationships. On the military side we have even more imponderables which often decide the fate of an operation, or of a war, or even of a nation. And always the enemy endeavors to upset our plans. In the field of political science the public reactions or the international complications may upset your best-laid plans, but not with the ruthless methods of a desperate enemy.

In contrast to this the engineer, for example, who designs a bridge can calculate to the fourth decimal point the stress and strain to be imposed on each member. He can be certain that it will carry the load for which it is designed, unless an act of God beyond the anticipation of mere man should intervene. We, however, encounter unpredictable difficulties. For example: during the recent Dieppe raid, despite all the secrecy precautions, the success of the raid was seriously affected by the chance encounter with a German guardship convoying some barges along the French coast. The African operation now in progress involved innumerable imponderables and hazards. Certainly ours are not exact sciences and for that reason are all the more difficult of application.

I believe the subject for tonight's discussion is "The United Nations". The question of unity of command among allied nations is therefore pertinent to the occasion. It is a dominating factor in the problem of the United Nations at the present time. Of all the military lessons which could have been learned from the last war, the question of unity of command is probably the most outstanding. Personally, I learned my les-

son in observing the problems of General Pershing in France and the reluctance of our Allies to meet the issue until almost overwhelmed by the great German offensive of March 1918.

For that reason the first step taken by the Chiefs of Staff of Great Britain and the United States at the initial meeting in Washington in December 1941 was to establish a basis of procedure to secure coördinated action. The first move, which had to be made immediately, was to establish a basis for unity of command in the southwest Pacific—to gather together in the quickest possible time our scanty forces to meet the carefully prepared Japanese onslaught. The framework and the details of procedure established at that time have furnished a foundation for all combined action between Great Britain and the United States since that date. In other words, within three weeks of our entry into this war we had organized a system which would provide a working basis for the strategical direction of our war efforts, the allocation of forces and of material, and the coördination or production of munitions. It has of necessity been a vastly complicated problem. The interests of many nations are involved. Take, for example, the initial problem of establishing unity of command in the southwest Pacific under General Wavell. The interests, the aspirations, the military forces and the people of the United States, of Great Britain, of the Dutch, the Chinese, the Burmese, the Australians and the New Zealanders, all had to be considered, and it must be remembered that you cannot reach decisions through a Congress of Nations that will furnish unlimited debates but rarely timely decisions to meet a pressing situation.

In the southwest Pacific were factors involving the isolation of an American command in the Philippines, the approaching isolation of a British Empire command in Malaysia, the threat to the Burma Road, China's sole line of communications to the outside friendly world, the destruction of the government of the Netherlands East Indies, the threatened invasion of Australia, Portuguese interests in Timor, and our communications with the Far East through the islands of the south Pacific. The distances were tremendous, the racial groups numerous, and the political interests often diverse. In addition, the matter was complicated by problems of shipping, the vital factor of time, and the vast logistical requirements. So while it is an easy

matter to talk of unity of command, it is an extremely difficult matter to arrange on an effective basis.

Despite all of these difficulties the most heartening factor of the war to date, in my opinion, is the remarkable success which has thus far been achieved in coördinating and directing the military and allied interests of the United Nations.

In the past two days we have had a most impressive example of the practicable application of unity in command, an American Expeditionary Force, soldiers, sailors and aviators, supported by the British Fleet, by British flyers and by a British Army, all controlled by an American Commander in Chief, General Eisenhower, with a Deputy Commander also an American Army officer, General Clark. They are served by a combined staff of British and American officers, of soldiers and sailors and aviators. Officers of the British Army and Navy senior to General Eisenhower, men of great distinction and long experience, have, with complete loyalty, subordinated themselves to his leadership. The instructions of the British Cabinet to guide their Army commander serving under General Eisenhower furnish a model of readiness of a great nation to coöperate in every practicable manner. I go into detail because this should not be a secret. It will be most depressing news to our enemies. It is the declaration of their doom.

My particular interest at this time in your affairs rests on the fact that after a war a democracy like ours usually throws to the winds whatever scientific approach has been developed in the conduct of the war. This is an historical fact. It is the result of the immediate post-war aversion of the people to everything military, and of the imperative demand of the taxpayer for relief from the burden imposed by the huge war debt. Incidentally, I do not think it is an overstatement to assert that if our government had followed through with the system of national defense laid down in specific terms by the Act of June 4, 1920, Germany would not have dared to involve herself in a war that would draw the United States into the conflict. In other words the present dreadful situation with the colossal debts to follow might quite possibly have been avoided by a scientific approach on our part to the matter of national defense in accordance with the terms laid down in the carefully drafted military policy of the Act of twenty-two years ago.

We are in a terrible war, and our every interest should be devoted to winning the war in the shortest possible time. However, in view of your interest in the science of government and the intimate relationship that it bears to military requirements, I would ask your very careful consideration of these related military factors in whatever studies you make regarding the readjustments which must follow this war. The theories on the subject will have to be compressed into the realities. The attitude of the taxpayer is human and inevitable. The differing reactions of the people in the center of the country, of those along the coasts—of the people who face the Pacific and the people who face the Atlantic—must be considered. The extreme distaste for things military, to which I have already referred and which always follows an exhausting war, will have to be taken into account. Then with all of these reactions, how can we so establish ourselves that we will not be doomed to a repetition of the succession of tragedies of the past thirty years? We must take the nations of the world as they are, the human passions and prejudices of peoples as they exist, and find some way to secure for us a free America in a peaceful world.

[Applause]

REMARKS

CHAIRMAN KEPPEL: General Marshall, once again I have been deprived of the privilege of thanking our speakers. Once again the audience has done it for me. But we do thank you from the bottom of our hearts.

And now, ladies and gentlemen, I must, and I do it reluctantly, because I have never talked to so many people in all my life, give over these proceedings and this audience to the rightful proprietor, the President of the Academy, Mr. Douglas. [Applause]

MR. LEWIS W. DOUGLAS: Mr. Chairman, Members of the Academy and its Distinguished Guests: Your Chairman has, like the slacker that he is, turned over to me the difficult task of pulling together the threads of this occasion. I wish that I had the capacity to thank all those who have contributed to the discussions of the day and adequately to extend our appreciation to those who have participated in this discussion this evening.

Mr. Butler, it was good of you to remind us that the twenty-four years, barring but a few hours, that span the period from the Armistice of 1918 to the present never achieved that distinction that is rightly accorded to a period of peace. It was right of you to remind us that unrestrained national sovereignty has once more proved to be precisely what Robert Y. Hayne called it, the serpent to our Paradise.

Ambassador Grew, we thank you for coming tonight and telling us in this intimate fashion of your experiences in Japan and of your estimate of its potential might in the Pacific.

And to you, Admiral King and General Marshall, the Academy extends its warm friendliness and reposes in you complete confidence. [Applause]

THE UNITED NATIONS

LEWIS W. DOUGLAS

President of The Academy of Political Science
Deputy Administrator, War Shipping Administration

I HAVE a mongrel thing here. It is neither one of those intimate speeches like Ambassador Grew's nor is it entirely fixed. Where it came from, I can hardly guess except that perhaps I should confess it came from a pen that was unduly burdened and a mind that is too heavily weighted with its own inadequacies. But, may I say, as I look around the hall and scan the program for the occasion, that this is not, as some might guess it to be, given over to a discussion of the affairs of only two of the United Nations. There are colors missing here tonight, and although absent from the platform, the representatives of other nations, a part of the gallant company of peoples dedicated to the defeat and extermination of Axis aggression and slavery, are here with us in spirit and are ever present in our calculations of our united strength.

The memory of man is short and often too confounded. It is therefore not unfitting on an evening given to discussing the subject of the United Nations briefly to revive our failing recollections.

We here in America, far removed from the theaters of war where men are dying, and from the populated cities of the Orient and Europe where friendly homes are being destroyed and women and children are the innocent targets of destruction from the air, cannot measure the debt we owe to those brave people who for many years have been standing off our enemies.

Longer than all the rest of us, the Chinese, driven inland from their shores, have been miraculously carrying on, with little more than their bare hands, the struggle against the armies of Japan. Their determination to fight and their courage in continuing to fight have given us a freedom of action that we would not otherwise possess.

The ships and crews of the governments in exile, victims of as violent an aggression as is recorded in all history, are sailing the seas carrying munitions of war and vital equipment to our united armies.

We are rightly humble before the heroism of those people who, under many flags, in Europe are secretly and unafraid carrying on their dangerous work of organizing against the day when hope of liberation from an unconscionable tyranny will be translated into reality.

We can never reckon the full contribution of those gallant fighting Russians who believed that death itself was better than surrender. It was their unflagging determination to maintain intact an organized military force, it was their grim and desperate stubbornness against overwhelming odds that diverted German armies from the west to the east, and thus snatched for us that precious period of time in which to muster the combined allied resources of production and of men, to reorganize our strength, and so to deliver telling blows against the enemy before it was too late. Were it not for the unfaltering faith that stood off all the hordes of Hitler across the vast expanse of Russia, we would not now be landing on the shores of Africa and penning up the Axis Powers in Europe.

Of the British Commonwealth and England our prodded memories must lead us to say, "They gave us and Russia a chance to fight."

Can we forget that feat of arms at Dunkerque, gallant above all gallantry? Can we forget, after the fall of France, the way in which the Royal Air Force repelled what Hitler with his countless planes expected—and what many other men of little faith prophesied—would be the invasion of the last defender of the democratic creed with whom he was then at war?

Can we forget the risks the British ran when in 1940 they stripped their island, then under attack, of the last meager bit of equipment, and sent it halfway round the world to hold Suez, the gateway to the East, and oil, and Africa?

Can we forget that single-handed, against the mightiest accumulation of arms and armies ever known, they kept the enemy at bay—held him constrained—and desperately clung to the strategic corners of the world, until our valiant Russian partner and, at last but not too late, ourselves became engaged in this titanic struggle?

No lingering doubt as to their valor, no worn-out prejudice no ancient grudge, can long withstand this stout record of achievement.

Yes, the memory of man is short and often too confounded. To forget these things that should compel us to repose full faith in one another is to do what Hitler and his minions of deception would have us do.

This brief reckoning of the incalculable debt we owe our partners should, too, remind us that this is a war that has wrapped itself around the globe, engulfing peoples everywhere, manifesting itself under the waters and upon the waters of the seven seas, drenching with blood the soil of every continent, and splitting the heavens with the drone of motors and the explosions of bombs.

It is one war, demanding one strategy. It does not permit of solitary, unrelated ventures that sap our combined and united strength, impair our capacity to strike, and postpone unnecessarily the day when peace shall come once more.

This is one war. The combined expedition into Africa commits us beyond recall to the proposition that to fight it as several wars, to be indifferent to the power of the combined resources of our partners and ourselves, would needlessly sacrifice countless numbers of brave young lives.

This is, I say, one war. With one strategy, one combined strength, one united effort, by all the United Nations, bound together in one partnership consecrated to the speedy winning of the victory, the eradication of aggression, and the obliteration of tyranny, we can recapture once more a chance to go about our business in lasting peace. [Applause]

REMARKS

MR. DOUGLAS: And now, Father Gannon, would you close this memorable occasion with your benediction?

DR. ROBERT IGNATIUS GANNON [President of the University]: There is nothing on an occasion of this kind that is so suitable for all the United Nations of the world as the one prayer that can come from the heart of every man who believes in a personal God. Let us say the "Our Father" together.

[The audience joined in the recitation of the Lord's Prayer, after which the meeting adjourned.]

Follows on the bark of the *Quercus* in the open woods, and
is often the first to appear in the spring.

It is a small, pale yellow, bell-shaped flower, with a short
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